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PAPERS & PROCEEDINGS

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THE ROYAL SOCIETY OF TASMANIA

The Royal Society of Tasmania was founded on the 14th October, 1843, by His Excellency Sir John Eardley Eardley Wilmot, Lieutenant Governor of Van Diemen's Land, as "The Botanical and Horticultural Society of Van Diemen's Land." The Botanical Gardens in the Queen's Domain, near Hobart, were shortly afterwards placed under its management, and a grant of £400 a year towards their maintenance was made by the Government. In 1844, His Excellency announced to the Society that Her Majesty the Queen had signified her consent to become its patron; and that its designation should thenceforward be "The Royal Society of Van Diemen's Land for Horticulture, Botany, and the Advancement of Science."

In 1848 the Society established the Tasmanian Museum; and in 1849 it commenced the publication of its "Papers and Proceedings."

In 1854 the Legislative Council of Tasmania by "The Royal Society Act" made provision for vesting the property of the Society in trustees, and for other matters connected with the management of its affairs.

In 1855 the name of the Colony was changed to Tasmania, and the Society then became "The Royal Society of Tasmania for Horticulture, Botany, and the Advancement of Science."

In 1860 a piece of ground at the corner of Argyle and Macquarie streets, Hobart, was given by the Crown to the Society as a site for a Museum, and a grant of £3,000 was made for the erection of a building. The Society contributed £1,800 towards the cost, and the new Museum was finished in 1862.

In 1885 the Society gave back to the Crown the Botanical Gardens and the Museum, which, with the collections of the Museum, were vested in a body of trustees, of whom six are chosen from the Society. In consideration of the services it had rendered in the promotion of science, and in the formation and management of the Museum and Gardens, the right was reserved to the Society to have exclusive possession of sufficient and convenient rooms in the Museum, for the safe custody of its Library, and for its meetings, and for all other purposes connected with it.

In 1911 the Parliament of Tasmania, by "The Royal Society Act, 1911," created the Society a body corporate by the name of "The Royal Society of Tasmania," with perpetual succession.

The object of the Society is declared by its Rules to be the advancement of knowledge."

His Majesty the King is Patron of the Society; and His Excellency the Governor of Tasmania is President.

THE ROYAL SOCIETY OF TASMANIA

PAPERS AND PROCEEDINGS, 1926

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PAPERS

OF

THE ROYAL SOCIETY OF TASMANIA

1926

NOTE ON THE ISOSTATIC BACKGROUND OF TASMANIAN PHYSIOGRAPHY.

By

A. N. LEWIS, *M.C.*, LL.M.

(Read 8th March, 1926.)

1. INTRODUCTORY.

The field observations accumulated for the evolving of the theory here propounded would fill a large volume, but it is more than an impossibility to get such a work published. Without this data my theory of the evolution of our major topographical features cannot be proved. However, some prevalent ideas appear to me to be so fundamentally in error that I am tempted to put on record the bare statement of the results of three years' field work. I trust that other observers will subject this theory to the closest scrutiny, and if this paper directs attention to several features hitherto overlooked it will prove useful.

Tasmanian physiography is so closely connected with the great occurrences of dolerite (diabase) that a correct understanding of the one is essential for the deciphering of the other. Every worker in geology in Tasmania has made some contribution towards the elucidation of the problem, and this paper merely carries our knowledge a little further. The statements here contained are not proved, and await further confirmation.

The deciphering of causal processes involves the reconstruction of the history of the landscape. In this paper I commence with notes on different rock series, stressing points which throw light on physiographical development, and then I summarise the conclusions forced on me by the

field evidence. In regard to the Permo-Carboniferous-Trias-Jura rocks I accept, and my observations confirm, the statements and conclusions contained in *The Coal Resources of Tasmania.* In regard to the Devonian-Carboniferous and the Tertiary periods, the stratigraphical succession given here is based on recent field observations.

2. THE DEVONIAN-CARBONIFEROUS PERIOD.

The early Palæozoic sedimentations were brought to a definite termination by a major epoch of diastrophism occurring at the close of the Silurian or beginning of the Devonian period. Then great chains of folded mountains were formed over the present site of Tasmania, and within these granite batholiths consolidated (e.g., the granite mountains of the East Coast, and the Heemskirk Range and Granite Tor on the West). This epoch may be taken as the dawn of our present era, and divides Tasmanian stratigraphical geology in half—before it lies the ages of indecipherable physiographic conditions, and after it the historical records are voluminous and reasonably complete, merely requiring correct interpretation.

This diastrophism was followed, apparently, by a long epoch of quiescence, during which sub-aerial conditions existed over the whole of Tasmania, and which corresponds to the Devonian and Carboniferous periods elsewhere. By the end of the latter period the mountain ranges had been entirely denuded and the batholithic cores of granite exposed, in many places to a depth of 2,000 feet. Base-level peneplainal conditions existed in general, but with, certainly on the east and north, many isolated mountain peaks and, west of a line between the mouths of the Forth and the New Rivers, more elevated country.

3. THE PERMO-JURA SEDIMENTATION PERIOD.

This period, comprising rocks of Permo-Carboniferous, Triassic, and Jurassic ages, is in Tasmania one unbroken sequence, and I suggest the above name as a convenient one It followed the last without an apparent break. At the time of the commencement of the Permo-Carboniferous glacial period the old land surface began to disappear below sea-level. Possibly the sinking commenced earlier, but only brought the rock platform to sea-level at this time. The cause of this sinking is discussed later. The following is an outline of the history of the period:—

A. Glacial Series.

This commenced just as the old rock platform reached sea-level. Where observable, deposits of this series rest on pre-Devonian rocks except at Cape Paul Lamanon, where Permo-Carboniferous limestones underlie them. Evidence points to intense ice-sheet conditions to the west, and at Wynyard and Weld River definite moraines can be found. These appear to have been dropped on a land surface. On the east and southern coasts glacial deposits appear to have originated from small valley glaciers and to have been deposited very often in shallow sea water (e.g., at Maria Island, Cape Paul Lamanon, round Hobart). The greatest observed thickness of these beds is about 2,000 feet at Wynyard, but this has no necessary connection with land movements.

B. Lower Marine Series.

Rocks referable to this series began to be deposited in the latter stages of the glacial age. Fossil evidence proves open shore line conditions and a depth not exceeding 100 fathoms. A maximum of 1,000 feet of lime- and mud-stones was deposited on a sea floor teeming the whole while with beach life, and throughout their deposition their surface was maintained at the same level, no species of the thousands entombed ceasing to flourish on the surface. Occasional bands of sandstone indicate local changes, probably referable to sea currents, and the succeeding beds of limestone show no material alteration of relative strand level.

C. Greta Series.

Then for a short time this sea floor was raised in certain localities just above sea-level, and shales, sandstones, and coal-measures were accumulated to a depth varying from 140 feet at Preolenna to 850 feet at Bruny. In other places the sea still covered the recently deposited sediments, but at a shallower depth, and marine shales were deposited (e.g., around Hobart). In the Mersey basin these were impregnated with spores or sporangia of cryptogams or algal organisms, and the Tasmanite (Mersey oil shale) beds resulted. These plants must have been growing on islands of Silurian rock which had not yet been submerged. In places Tasmanite is found directly covering Silurian strata without the interposition of marine sediments. This feature is referred to later. The rise necessary to produce these

conditions would be under 600 feet, and a corresponding amount of sediments was deposited while the surface was maintained at sea-level. Perhaps the change of conditions was due to sinking of the ocean surface. In any case, the general sinking tendency was not interrupted.

D. Upper Marine Series.

Evidently the regular downward movement continued, and the Greta series was covered by these mud-stones, the nature of which indicates very shallow, close inshore, muddy conditions. Nearly 1,000 feet were accumulated (e.g., round Hobart), and throughout the time necessary for this deposition the surface remained at approximately the same elevation in reference to sea-level.

E. Tomago Series.

The Upper Marine Series was followed by conditions just above sea-level, during which shales and coal measures were formed. At Barn Bluff these attain a thickness of 740 feet.

F. Ross Series.

Similar geographic conditions persisted for a very long while, and are characterised by the Ross sandstones, rocks obviously formed from wind-driven sand. Lagoon and terrestrial conditions are occasionally indicated locally. These rocks accumulated—after 50 feet of grits—to a maximum of 700 feet without any indication of a change of geographical conditions.

G. Felspathic Sandstone Series.

Following the Ross series is a bed of great thickness, certainly over 800 feet as observed in many localities (e.g., Fingal, Dalmayne, etc.), and, from observations at Catamaran, perhaps originally 3,000 feet in thickness. The only material changes from the last series are the greater proportion of felspar among the sand grains and a slightly more swampy and enclosed topography. For the whole of the enormous length of time necessary for the accumulation of these beds, the surface kept at the same level relative to sea-level. Bands of shale, sandstone, and coal measures alternate, and all are impregnated with fossil remains of the same species of land plants. Probably such an accumulation requires a greater time than that necessary for the deposition of a similar depth of marine sediments.

H. KNOCKLOFTY SERIES.

In a few localities, especially west of Hobart and at Mt. Nicholas, the felspathic series are succeeded by further sandstones, indicating a return to open sand-dune conditions, and with, at Cascades and Tinderbox, remains of sea fishes. At the type locality a thickness of 1,350 feet is attained.

The sedimentation was closed abruptly and definitely by dolerite intrusions or accompanying earth movements. Nowhere has a complete succession of these sediments been observed, and therefore definite information as to maximum depth is not available. There is a certain variation in thickness from place to place, but later events have often been responsible, and there is much overlapping when a small section in one part of the country is compared with one at a distance. Probably between 5,000 and 8,000 feet of sediments were deposited. I incline toward the higher figure.

It is not possible at present to say from where these sediments came, but it must be remembered that the present limits of Tasmania are of recent evolution. Probably land to the westward or north-westward forming a southern extension of the Australian continental mass, and of which the ancient rocks of our West Coast are a remnant, supplied the sediment. There is also some evidence of land to the eastward.

4. ISOSTATICS OF THE SEDIMENTATION PERIOD.

At any time during the very lengthy period necessary for the accumulation of these deposits, the surface of the newest sediment was never more than 600 feet below sea-level, or 200 feet above. Probably the surface did not vary 200 feet. Several series of over 1,000 feet show no alteration of geographical condition or strand line at the surface, and there is no unconformity, discontinuity, or evidence of streams or other physiographical features. It cannot be assumed that the older surface of the globe was sinking regularly and an exact equivalent volume of sediment was deposited. Even if the sinking could be so regular, the supply of sediment is not likely to be so constant, and a very definite relation is indicated between sinking and deposition. In other words, examination of these beds forces the conclusion that the accumulation caused the sinking.

Interesting proof of the general sinking of the old land surface and of the fact that this persisted over at least the present area of Tasmania and was not by local segments is provided in several localities where hills remained at the commencement of the sedimentation period. These often now stand as islands embedded in the sedimentary series, and later members are deposited directly on the pre-Devonian rocks without the interposition of earlier members as the general sinking brought these older rocks down to the sedimentation level. Thus at Barn Bluff, in places, marine mudstones lie on Proterozoic schists, but here and there over the location of ancient hills the Tomago Series rests directly on them without any of the Marine Series intervening, and at Cradle Mountain both are absent and Ross sandstones directly succeed the original platform. Again, at Ida Bay, Upper Marine limestones unconformably succeed Silurian limestones; a little farther south Ross sandstones, and farther south still, felspathic sandstones rest directly on the Silurian rocks, and in each case the floor of the more recent sedimentary series appears at the same level over the limestones as it does elsewhere in the locality over the next inferior member of its own series. At Latrobe many included islands of Silurian quartzites are found in the shale beds, and these older rocks in no way interrupt the strata elsewhere. In places down the East Coast felspathic series rocks may be seen resting on the early Devonian granite batholiths, while elsewhere, in places where the granite did not rise so high (e.g., Maria Island), earlier series cover it.

The first question that must be solved before we can proceed further is how such a delicate adjustment extending over so many millions of years could have taken place. Field evidence first forced on me the explanation of the dolerite intrusions set out in para. 6 *post*. In seeking confirmation I came to the conclusion that these sediments were gradually forcing their rock floor into a magmatic reservoir. Without the opportunities afforded in large centres, I hesitated to advance such a theory until I read an article by Mr. W. B. Wright in the Geological Magazine of May, 1925, elaborating a theory that such a process could occur. It is interesting to find this confirmation on theoretical grounds of an empirical hypothesis evolved from field evidence.

The explanation of the perfect and instantaneous adjustment to the added sentiments then is that, throughout this period, there existed deep in the crust below Tasmania

a magma reservoir which allowed perfect adjustment to added weight on the old rock platform. The pressure of the accumulating sediments squeezed the magma outward—probably towards the west. This in turn caused a gentle rise in the land surface at some distance, and allowed the supply of sediment to be maintained.

The sedimentation period closed abruptly when the magma could no longer accommodate itself to the gradual increase of pressure. The isostatic conditions during this period were therefore those of perfect adjustment due probably to the existence of a magma reservoir. Further features regarding this magma will be discussed when the dolerite intrusions have been described.

5. DATE OF THE DOLERITE INTRUSIONS.

There is no doubt in my mind that this must be fixed in the Jurassic period, while typical flora of that age was flourishing and coal measures were being deposited. The intrusions terminate the sedimentation period most abruptly. No interval elapsed between the end of the depositions and the great diastrophic events, and no Cretaceous rocks have been identified. R. M. Johnston records the inclusion of a Jurassic plant in the dolerite of Mt. Faulkner (Johnston, 1922). At the New Town brick quarry and on the shore of South Cape Bay (see also Twelvetrees, 1915), I have seen boulders of what appears to be waterworn dolerite embedded in the coal measures. There is evidence in the Catamaran coal field and elsewhere that the dolerite penetrated unconsolidated mud, and it is by no means certain that sedimentation did not continue there and at La Pérouse in local patches for a short while after the intrusions. At present all we can say is that the dolerite intrusions closed this sedimentation period in Tasmania.

6. NATURE OF THE INTRUSIONS.

Round the dolerite has grown a literature worthy of its importance, and the main features are well enough known, but several must be stressed, as they have previously been misinterpreted or, to my way of thinking, wrongly explained. The following are the vital features for our present investigation:—

(i) The Absence of Any Violence in the Course of the Intrusions.

This is the most outstanding feature in connection with this rock. It is common to find dykes up to a quarter of a

mile in width penetrating strata without any trace of disturbance. The Catamaran Dyke at South Cape Bay is 300 yards across, and intrudes coal measures. It has only affected these rocks to the extent of 10 feet alteration of level and one degree alteration of dip between the beds on one side and the beds on the other, and these differences may not have been caused by the dyke. Along Augusta Road and at East Risdon smaller dykes may be seen which do not alter the strata at all, and examples abound everywhere. Again sills up to 1,000 feet in thickness do not appear to have altered the strata above or below. At the summit of La Pérouse horizontal felspathic shales lie on the top of a sill 800 feet in depth, similar rocks exist below, and the strata are continued uninterrupted on the same horizontal level as the sill. On the Central Plateau horizontal and unaltered rocks (Ross sandstone at Arthur's Lakes, Marine mudstones at Chudleigh Lakes) lie on the top of perhaps 2,000 feet of sill, and unaltered horizontal limestones pass below it (e.g., at Waddamana). On the flanks of Mt. Wellington, Mt. Field, Adamson's Peak, Ben Lomond, and many other mountains many hundreds of feet of undisturbed sedimentary rock rest on hundreds of feet of laterally thrusted dolerite sills.

Metamorphism is always present at the intrusive contact, but in most cases I have not been able to find any trace of mechanical pressure, even when coal measures have been penetrated. Finest laminæ often continue right up to the igneous rock, which frequently meets them with a junction as sharp as a pencil line. Even coal seams are frequently penetrated without disturbance, and at Catamaran a sill of great thickness, certainly over 200 feet, underlies a coal seam by 6 feet for several hundred acres. and no trace of mechanical force can be traced in this seam. It is almost certain that this sill is intrusive.

(ii) The Dolerite Was Intrusive, At Least In Most Cases.

At times, metamorphism at the contact is obvious, although it seldom extends for a dozen feet, also there is usually a chilled margin zone in the igneous rock. But usually the only effect is an induration of the intruded rock for a few inches. However, in hundreds of occurrences examined I have never seen this absent, although, at times (e.g., at Catamaran and La Pérouse), it had to be searched for with a lens. A flow may have occurred on the top of the sedimentary series, but occurrences in lower members of the series must have been intrusions.

(iii) The Intrusions Take a Great Variety of Forms.

As has been pointed out (see *Coal Resources of Tasmania*), the dolerite is not found in any form which may be called typical, but a frequent form is that of a long dyke with a wall-like edge on one side, and on the other, one or more extensions in the form of sills, often extending for a considerable distance—these sills always having a very irregular outer edge. Mr. Nye's happy term—"asymmetric transgressive igneous mass of a general laccolithic type"—is very appropriate, but such forms may often be resolved into an irregular dyke with many offshoots, in the forms of sills, minor dykes, and latholith-like bulges. The absence of true latholiths is attributable to the mechanics of the intrusions described above. In general, it seems that the ascending dyke with its accompanying sill or sills is the typical form. So regularly do we find these features that we may almost enunciate the rule "no dyke without a sill."

It appears that the magma ascended vertically on a base of varying width, and as soon as an opportunity presented it intruded a horizontal wedge through the strata. Coal measures have been particularly attacked in this way, and the more massive members of the series are comparatively free. Often sills immediately underlie and overlie Ross sandstone beds.

(iv) The Present Dolerite Occurrences Were Originally At Very Different Levels.

In other words, the idea of a single sheet (sill or flow), as some earlier writers appear to have visualised, is not supported by field evidence. It is certain from the sedimentary rocks themselves that there was no great disturbance of these before the dolerite intrusions. To-day we find sills of dolerite intruding Cambrian or Silurian quartzites at Mt. Anne, directly overlying such rocks at Mt. Wedge, intruding Lower Marine limestones at Mt. Nelson, Ralph's Bay Neck, Cape Frederick Henry, etc., Upper Marine mudstones at Brown's River and Mt. Ironstone, Ross sandstones at Mt. Rumney, Grass Tree Hill, and Mt. Field West, felspathic series everywhere, and Knocklofty sandstones at Knocklofty, to give occasional examples only in each case. Successive intrusions throughout the whole of the sedimentation period are out of the question. Therefore, the original sills, etc., must at first have been at various levels, with a possible range of over 8,000 feet, whatever their present position may be. Where a sill is underlain and overlain by

Lower Marine mudstone, as at Mt. Nelson, and another intrudes Ross sandstone, as at the summit of Mt. Wellington, and a third intrudes Knocklofty sandstone, as at Knocklofty, the evidence points most strongly to three separate occurrences at different depths.

(v) Crystalline Structure As At Present Worked Out Affords Little Help in Deciphering Field Occurrences.

There is a great variation in the internal structure of the dolerite—from entirely microcrystalline to a completely crystallised rock with labradorite crystals 10 x 2 mm. Porphyritic structure is occasionally found, and a glassy base is common. In a few localities the dolerite passes into gabbro. It must be pointed out that the finest variety is basalt of accepted classifications. In Tasmania the term "basalt," has, by usage, become appropriated to the olivine variety of late Tertiary age, but this must not be allowed to obscure correct petrological classification.

There appears to be no absolute or constant relationship between stratigraphical situation and crystallographic structure. Small dykes and sills are usually of the finest-grained variety, and larger occurrences are usually of the normal holocrystalline type. A chilled margin zone is usually present. But none of these features appears constant. The occurrences at Mt. Anne (in Silurian strata), Mt. Nelson (in Lower Permo-Carboniferous strata), the Domain (in felspathic series), Pindar's Peak (on the very top of the sedimentary series) show exactly the same degree of crystallisation, in spite of their original difference of level. Again, on the route of the Launceston transmission line down the Central Plateau, a vertical depth of 2,000 feet of dolerite is observable. The whole of this depth shows no alteration, and is a uniformly fine-grained rock. Cradle Mountain shows the same feature to a depth of 1,000 feet, and on La Pérouse a sill 800 feet in thickness and 400 yards broad is extremely fine-grained, while a mile away at Pindar's Peak a laccolith-like extension at the same stratigraphic level shows very large crystals.

(vi) No Evidence of Vulcanism Now Exists, But It By No Means Follows That None Occurred.

It must be remembered that even if this magma ever flowed over the land surface, it has been subject to erosion since Jurassic times. Pliocene lavas in Tasmania have lost all trace of cones, vents, etc., and so we cannot point to the absence of these features in Jurassic rocks as proof that

they never existed. On the other hand, as Mr. R. M. Johnston once said:—"It seemed to him incredible that a massive "sill 2,000-3,000 feet thick could be thrust for vast distances "between planes of stratified bedding of soft coal measures, "say within 800 feet of the surface, without causing innumer- "able fissures and fractures through which some portions of "the magma would be forced to the surface in the form of "lava, ashes, etc." (Johnston, 1898.) This—with some verbal modification—is my opinion. Against such deductive reasoning we have the negative evidence that no traces of lava flows or volcanos have been identified, and the opinion that crystallisation took place under great pressure. Both these objections will be answered in a later paragraph.

Much work remains to be done on the crystallography of the dolerite, and it is possible that a careful investigation of this branch would point to valuable conclusions, but it must be studied in the closest conjunction with field occurrences—a consideration which has been often neglected in the past.

7. PREVIOUS OPINIONS.

The wealth of field evidence available and the apparent conflict between this evidence in various localities makes it difficult to discover the true sequence of events. The history of philosophical thought on this subject may be summarised as follows:—Originally the dolerite mountain caps were considered to be volcanic, and earlier than the sedimentary series which were laid down on them. All the earlier geologists appear to have held this view, including Darwin (*Voyage of the Beagle*), and R. M. Johnston incorporated it in his Geology of Tasmania. (See Johnston, 1898.) Later, contact metamorphism was recognised. I am unaware whether Mr. T. Stephens first made the discovery, but he became the first champion of this idea, and many fiery debates on this subject were staged between him and Mr. Johnston before this society. Eventually Mr. Johnston accepted the evidence of intrusion. In 1898 Mr. Twelvetrees and Mr. Petterd (Twelvetrees, 1898) read a paper embodying the results of microscopic investigations, and they there advanced the conclusion that the dolerite intrusions must have cooled under great pressure. To permit of this, they postulated many thousands of feet of sedimentary rocks as an original covering for our present mountain tops, which mass of rock was subsequently eroded away, leaving bare the dolerite sills.

In 1915 Mr. Twelvetrees (Twelvetrees, 1915 (i)) elaborated his views. He recognised the existence of many true sills, the present position of which could only be accounted for by block faulting after a period of post-dolerite erosion. He also then set out the view that once dolerite was met with, it would continue downwards indefinitely.

In 1922 the Geological Survey thus set out their opinion:—"The diabase seems to have risen from below in a "somewhat similar fashion over almost the whole of northern, "eastern, southern, and central Tasmania, but the height to "which it rose varied greatly from point to point, there being "a range in elevation of the order of 5,000 feet. It was "this variation in the height reached by the diabase which "has caused the present existence of blocks of Permo-Car- "boniferous and Trias-Jura sediments at such varying "heights above sea-level, for it was only those blocks which "were raised to the highest levels which have suffered such "denudation as to have the sediments removed which lay on "the surface of the upwelling molten mass."

It was the impossibility of reconciling this statement with the field evidence in many places, especially in Southern Tasmania, that led me to undertake the investigations which have resulted in the conclusions here summarised.

8. ISOSTATICS OF THE DOLERITE INTRUSIONS.

In the first place, the magma referred to in para. 4, *supra*, must be assumed to have existed below the platform of ancient rocks upon which the sedimentary rocks were deposited. It is difficult to give reasons for the existence of this magma, but probably the fact that Tasmania is a wedge between the Pacific Coast trend line of the Australian continental mass, running S.W. and N.E., and the S.E. extension of the southern trend line of this mass, has something to do with it. Mountain systems, valleys, faults, etc., in Tasmania all give the impression of a pinching towards the south. A significant fact, also, which I have not seen commented on before is that, whereas on the continental masses vast areas are covered by similar rocks and most systems are of considerable extent, on small islands off the coasts of these continents there is often a very great vertical range of geological systems all of small extent. This applies to Tasmania—which within its 27,000 square miles has representatives of every age since the Proterozoic and of almost every petrological species known to science—and also to England, Japan, New Zealand, and other similarly situated

islands. This leads us to the view that these appendages have been subject to every influence induced by isostatic causes. Certainly Tasmania appears to have been subjected to a rapid sequence of deposition and diastrophic epochs to an extent not equalled by any area of similar size on the continent of Australia. Whatever the reason for this may be, the pinching between the Tasman Sea and the Southern Ocean blocks of relative greater density appears to have had some effect. Perhaps these maintained a ge-anticline under Tasmania and with the release of pressure due to Devonian-Carboniferous erosion the enclosed rocks fused.

The magma began to exist from Permian times or slightly earlier. It cannot be connected with any result of the Devonian diastrophism which produced acidic magmas. The accumulation of sediments forced the rock platform deeper into this magma, or, in other words, the existence of the plutonic reservoir provided a weakness in the foundations which yielded to added weight. Up to the end of the Jurassic period the magma was able to accommodate itself to the displacement caused by the foundering segment. I reject as hopelessly speculative the theory that the Gondwana Land continent sank and simultaneously dolerite mountains were elevated in Tasmania. There is no clear evidence of the existence of Gondwana Land as a continental mass, or of its subsequent foundering, or of the date, mode, and effect of this happening. Too many intervals of time and connecting circumstances have to be assumed, and altogether it is too simple an explanation, and one for which there is not a scrap of evidence in Tasmania.

At the close of the Jurassic period either the magma completed its upward stoping process by reaching the surface or so near that its energy was exhausted or external pressure closed the paths by which it moved outwards in adjusting itself, and the added pressure squeezed portion of it towards the surface. The stage of these intrusions which we now see—that into the Permo-Jura sedimentary series—must have been accomplished at virtually the same time, and the effect where the lowest rocks of the platform were in contact with the magma for a long while has not yet been exposed to view. But, from whatever reason, these sedimentary rocks foundered in the basic magma.

As has been explained, there was an entire absence of violence. In many places whole segments of strata have disappeared, and it is clear they have not been pushed up-

ward by the dolerite (e.g., at Mt. Royal Point, Brown's River, Ralph's Bay Canal, and many other localities). The inference is that they completely foundered in the viscous mass, and their place was taken by igneous rock. The mechanics of the intrusion appears to have been a stoping process, with, apparently, a certain horizontal splitting and often a sinking of separated wedges. There is an entire absence of evidence to show that this magma could or did raise our mountains to, approximately, their present position, and these features can be satisfactorily explained otherwise. Our only evidence shows that the dolerite intrusions or earth movements accompanying them raised the land above sea and coal swamp level. If the older rocks were of greater density than the dolerite they would have tended to founder in it, and if they were of a less density the magma would have escaped at the break. The top of the recent sediments was at sea-level, and all we can say is that the dolerite reached that point and probably boiled over the surface and piled up into considerable domes. This explains how a dyke half a mile broad, ten miles long, and of unknown depth, could be found in coal measures without any displacement of the sediments.

The objection to this conclusion forced upon observers by field evidence, is that provided by crystallographic structure, namely, as Twelvetrees and Petterd put it, "this rock "must have cooled under great pressure." This has been accepted in the past, and the field evidence constructed to fit it, and subsequently removed by a convenient erosion. Field evidence shows that intrusive masses which must have consolidated under 8,000-10,000 feet of strata have exactly the same structure as some which must have consolidated under only a few hundred feet at most. There is also evidence that little, if any, of the felspathic series has been removed from some localities (e.g., Catamaran). Further, all that Twelvetrees' and Petterd's investigations show is that the magma crystallised to a certain extent before it radiated so much heat that crystallisation ceased. Crystallisation under pressure is only one of several ways in which the described features could have been imparted. Compare the trachy-dolerite occurrences at Table Cape and Circular Head, which no one has ever contended cooled at a great depth, yet they show crystals larger than the average in the dolerite. I have not given the necessary attention to this branch of the subject to speak with certainty, but I suggest that the magma had commenced to crystallise before

it reached the highest levels and that this crystallisation had proceeded sufficiently far to permit it being carried to a more or less complete conclusion in all except small occurrences by the energy imparted by the crystallisation. This would also explain the limited nature and occasional absence of metamorphism. But whatever the cause, we cannot stretch field evidence to fit a mineralogenetic theory.

Although it seems that the dolerite intrusions occurred as one event, there is some evidence of phases, and where normal dykes occur together with great irregular masses, the former appear to be the earlier, and the latter a result of a later continuation of the process. This certainly appears to have been the case at Catamaran and La Pérouse. Further, the fact that dykes are usually of fine-grained rock and the larger masses are coarse-grained points to the fact that the fine-grained occurrences were the first intrusions and the coarser types came somewhat later when crystallisation had proceeded a little farther. Of course, this only applies to cases in which a whole occurrence is fine-grained and not to small sill and dyke offshoots from a large mass.

9. OUTLINE OF THE SUBSEQUENT HISTORY OF OUR PHYSIOGRAPHY.

A. Development of a post-doleritic peneplain.

B. Era of Tertiary major block-faulting.

C. Tertiary volcanic period or periods.

D. Appearance of the present physiography.

E. Pleistocene Ice Age.

F. Some small local faulting (here or before E.).

These events will be touched upon *seriatim.*

10. THE TERTIARY PENEPLAINATION.

Tasmania, with the exception of a few square miles near Wynyard, does not appear to have been submerged again, and at whatever level the dolerite intrusions left the land there is ample evidence of the development of a peneplain prior to the movements which have given us the framework of our present topography.

(i) The remarkable concordance of mountain summits. Walch's Tasmanian Almanac gives the names of 39 mountains between 3,500-5,000 feet in altitude, and to these must

be added the many considerable plateaux. The idea of an ancient peneplain is forced on any observer viewing the panorama from the summit of Mt. Wellington.

(ii) In many places there exists on the top of mountain and plateau tops a definite topography which cannot have arisen from any agencies at work to-day or since the elevation of the mountain. For example, on the Central Plateau there are considerable mountains (e.g., Brady's Look Out, Dry Bluff, Mt. Ironstone, Walls of Jerusalem, and several smaller hills rising over 500 feet—1,000 feet in the case of Brady's Look Out) from the general level of the plateau. In most cases they are obviously isolated by river action in the course of the erosion of a tract of land very different from the elevated plateau of to-day. To-day lakes lie round the foot of these mountains, and no agents capable of this erosion are at work. The same is to be seen on Ben Lomond, Mts. Field, Hartz Mts., Mt. Picton, Mt. Wellington, and most of our higher mountains that are not sharp peaks.

(iii) Tertiary sediments have been accumulated in the valley of the South Esk and its tributaries and southwards past Oatlands to Jericho. These consist very largely of early Palæozoic quartzites, ore vein rock, and other ancient types. Not a single occurrence of such rock occurs in the valley of many of the streams that flow over these deposits. The pebbles are thoroughly waterworn and are typical river drifts. On the other hand, except in obviously recent and surface accumulations, dolerite pebbles are noticeably absent, yet dolerite caps all the many ranges where these streams have their source and is largely found in their valleys. Rocks similar to these Tertiary pebbles are found *in situ* on the West Coast, but are separated from the beds under discussion by the Central Plateau. Similar beds, protected from erosion by a layer of basalt, can be seen on the top of the plateau at the north edge of St. Patrick's Plains, on the road to the Great Lake, and, I am told, elsewhere on the Central Plateau. They also occur in the valley of the Derwent at Bridgewater, New Norfolk, and farther north, and around Hamilton and Bothwell, and west of Southport, in the extreme south. These accumulations are definitely post-doleritic, and appear to indicate that the present outline of Tasmania did not prevail when they were deposited, but rivers running from the west distributed them where we now find them, and that these beds were more or less

continuous, with the very considerable tertiary sediments on the West Coast.

For these reasons it appears that after the dolerite intrusions the land surface of Tasmania was subjected to a long erosion interval stretching from the beginning of the Cretaceous to at least late in the Miocene period. During this time the surface was reduced to a peneplain, and all traces of Jurassic vulcanism, if any, removed. In many places the intrusive sills of dolerite were exposed and eroded into definite topographic features, and over much of the surface accumulations up to 600 feet in depth of terrestrial deposits were built up in much the same way as similar deposits were accumulated in the Murray and Darling Valleys in Australia, at the same time.

11. THE TERTIARY MAJOR BLOCK-FAULTING.

For several years past I have been struck with the difficulty of reconciling some of our physiographic features with the theory that the dolerite intrusions *caused* the present differences of level, and for the following reasons it has been forced upon me that some other explanation is necessary:—

(i) Many of our greater valleys do not possess the characteristics that water erosion would have imparted, and at the same time it seems far-fetched to assume in general that the sides could have been pushed up by dolerite intruding from below and narrow chasms left. There is nothing to indicate such a happening. Frequently the valley side meets its floor at a decided angle, and the natural curves of erosion are absent (e.g., round the north-eastern edge of the Central Plateau), and the river meanders over a flat floor covered with flood plain deposits, and is not very actively engaged in eroding its valley.

(ii) The theory of the intrusions causing the present topography postulates a core of dolerite pushing up some segments, while leaving others as a retaining wall. Field evidence shows this has not happened. Frequent overflow lava streams would be the rule, but none such has ever been identified, neither have retaining walls nor elevated blocks.

(iii) The present mountain ranges appear to be independent of the form of the dolerite intrusions. Although dolerite caps most of the higher mountains, except towards the West Coast, there are exceptions, as at La Pérouse, many

of the hills east of the Derwent opposite Hobart, places on the Central Plateau, etc., while almost every dolerite-capped mountain has massive sedimentary beds on some flank. How can these exceptions be accounted for if the dolerite caused the elevation?

(iv) Although most of these mountains are dolerite capped, few, if any, consist entirely of dolerite. In most cases the cap does not extend a quarter of the way down the mountain side. If the cap caused the elevation, how can the raising of the remaining portion—often 3,000 feet (e.g., on Mt. Wellington and Mt. Field)—be accounted for? No dolerite, as a rule, supports what would be a considerable mountain even if the igneous rock were removed. Surely some cause subsequent to the dolerite intrusions must have elevated these masses.

(v) In almost every case where observations can be made dolerite sills are interstratified between the intruded sedimentary rocks. When these have been tilted the included sill has been tilted with them. I have never seen a horizontal or vertical occurrence of dolerite cutting a bed of inclined strata. If the strata are inclined the dolerite is inclined with it.

(vi) Everywhere cliffs and other features of a very juvenile drainage abound, and these often in the softest of rocks. In very few places can it be definitely said that river action has narrowed the watershed. Could such conditions have persisted if these mountains had been in existence since Jurassic times? Would not we have a reason to anticipate a most mature drainage system instead of a most youthful type?

The conclusion has therefore been forced upon me that the peneplaination was followed by an epoch of block-faulting on a major scale. This block-faulting was a gradual upward movement, and originated our present physiography. It occurred after the long erosion interval had exposed the dolerite sills in many places and it bodily lifted great tracts of country with their then topography into their present position.

The dolerite exercised a considerable physiographic control, by original resistance to the weather, by presenting in some cases a tough band in the strata to the disrupting forces, and in others a definite break, and thus modifying the local trend of the fault lines and also by subsequent resistance to erosion, especially through the Ice Age. Many

spurs and shoulders of our mountains (e.g., Snake Plains behind High Peak on Mt. Wellington, "The Shoulder" on Adamson's Peak, and best of all Table Mountain) are due to the resistance these dolerite sills offered to the breaking forces. But, although these influences were sometimes considerable, this is the extent of the dolerite control in the history of our landscape.

The fact that on one side of a dolerite hill we may find lower Marine limestones and on the other upper coal measures, is to be explained by the fact that the dolerite intruded one or other sedimentary zone and subsequently a fault-break occurred along one edge of the dolerite. This is exactly what can be clearly seen to have happened in every case I have examined. To hypothesise a vertical lift below one sedimentary bed and stationary conditions, or a vertical lift to a different degree below the other, is to explain one difficulty by creating a greater.

This theory of major block-faulting is strengthened by the general recognition of such faulting round the coasts, in some coal fields, and on the mainland of Australia. Further, relatively recent block-faulting is the obvious cause of such features as the Forth Gorge and the (so-called) Alum Cliffs on the Mersey. These features could hardly have persisted since Jurassic times. Also when the vast extent of erosion that has occurred since the dawn of the Pleistocene times (e.g., the Lake Dove, Lake Judd, and Lake Seal Cirques) is considered, it seems impossible that any of our mountains could have survived since Jurassic times when it is shown that little has been eroded from their summits.

12. AGE OF THE BLOCK-FAULTING.

The only thing that can be said under this head is that it was pre-glacial. As explained, it was later than the accumulations of Tertiary river sediments. These are dated, on very flimsy evidence, as Miocene. Taking into account the amount of erosion, previous to this faulting, and on the other hand the considerable volcanic period which elapsed prior to the Pleistocene glacial period, probably late Miocene or early Pliocene is the nearest date that can be fixed at present.

13. ISOSTATICS OF THE BLOCK-FAULTING EPOCH.

The Pliocene-Pleistocene periods throughout the world seem to have been times of earth stresses and adjustments.

These were felt in different parts of the world at different times, and it seems that the earlier the stress came on any part of the surface, the less severely was it felt. The causes of these stresses have been widely discussed, and appear to be due to adjustment of a plastic interior to varying pressures of surface segments, which variations are caused by necessary adjustments to a crystallising interior and by erosion removing weight from the land segments and adding it to the ocean segments. There is no need to repeat the accepted conclusions here, and I confine myself to the results apparent in Tasmania.

In Australia, during this time, pressure was being exerted from the Tasman Sea in a general north-westerly direction and from the Southern Ocean in a general northerly and north-easterly direction. Again, Tasmania lay between these two great compression lines. It seems that these stresses were first felt in Tasmania and passed as a ripple up the East Coast until they reached New Guinea and New Britain, where their effects are still being felt. The following facts are again observable:—

(i) The faulting was without violence. In many places adjacent blocks which have been displaced several thousands of feet are only crushed for a couple of feet from the centre of the fault (e.g., at the Waterworks).

(ii) It was gradual. Many rivers were able to adjust their valleys to the changing conditions (e.g., the Huon, to be discussed at length later).

(iii) The movement was vertical. There is no evidence of crumpling and only slight signs of local horizontal displacement (e.g., the bulging on the outcrop at Catamaran and the horizontal twist of the seam there, and the existence of an overthrust block of Marine mudstone just short of the National Park railway station). Elsewhere it appears that only vertical movements occurred.

The Huon River gives us most valuable evidence as to several of the features mentioned, and deserves special consideration. This river first becomes recognisable some miles south of Mt. Wedge, wandering through a broad plain not 1,000 feet above sea-level. It could find its way thence to the sea, via Lake Pedder and the Serpentine, without any rise, or via the Arthur Crossing with a rise of 200 feet or so. Instead, it cuts in a deep valley over 3,000 feet deep between Mt. Weld and Mt. Picton, and lower down between the Snowy Mountains and Mt. Hartz. The obvious explanation is that

the Huon commenced to run when the western land was the highest and before the great mountain systems farther east came into existence. It thus provides additional proof of block-faulting as the cause of these mountains' existence. Also it proves that the eastern systems rose and not that the western sank, and that this rising was very gradual. If any of these features were not correct, we should expect the watershed to run Mts. Wedge, Anne, Picton, etc., and not to lie on the plains west of the mountains, with rivers cutting thence through the highest ranges in the vicinity. Further, but less impressive, examples may be found in other river valleys. Again, Mr. Nye has shown that there has been no appreciable movement in the Midlands valley since the basalt flows. He definitely proved that this valley is not a trough fault or rift valley (Nye, 1921). Taking these as our field observations, the explanation that commends itself to me at present is this:—A slight shortening of the earth's crust under Tasmania occurred at this time from isostatic causes; that is, pressures developing in adjacent segments were relieved by compressional movements under Tasmania. The pressure came from the south-east, against a resistant block or slighter pressure on the west, and was very deep-seated. This resulted in a succession of rather open folds, starting towards the west, at a depth certainly below any Permo-Carboniferous sediments and probably of abysmal character. In response to this folding, the surface rocks—those we now see—not being under pressure and being very friable, broke into blocks. Over the anticlines these blocks were elevated and over synclines they, in general, remained stationary.

It must be borne in mind that these blocks are really not raised to any remarkable height, 3,500 feet is about the average, and when this is compared to a rough diameter of five miles—to say nothing of over 40 miles in the case of the Central Plateau—the amount of elevation is not inconsistent with the above theory.

It appears that there have been a succession of these lines of elevation. How far west they extended it is difficult to say—this depending on the determination whether the whole of the old West Coast rocks were once covered with Permo-Jura sediments, as some small localities were. Should this prove to be the case, the western ranges may be the results of an earlier phase of the movements being described.

Mr. Clemes (Clemes, 1924) has pointed out the existence of three successively elevated plateaux at Lake St. Clair.

The oldest, including Cradle Mt., the Pelions, the Du Cane Range, and Mt. Olympus, is the most westerly, the highest, and the most thoroughly dissected. Then comes the Great Lake Plateau—barely dissected, and finally the most south-easterly—the Lake Echo Plateau, which is only elevated to half the height of the former. This sequence can be traced farther south. Mountains east of a line from Hobart to Launceston carry on a further succession of ridges and valleys, the ridges decreasing in height as you proceed eastward. Ben Lomond is the only exception. Successive steps in the elevation of the Central Plateau can be traced along the road from Hobart to the Great Lake, the first at Constitution Hill, the second between Apsley and Bothwell, and the third between Red Gate and the Steppes. The ridges are not straight or continuous, but are broken by many cross valleys. All this is what you would expect from a surface adjustment in response to a plutonic folding, and the arrangement of the elevated blocks corresponds with pressure from the south-east in a succession of ridges beginning in the west. Also the very persistent general westerly dip over so much of Tasmania, with the break on the east of each bed, is too significant to be altogether overlooked. The Bass Straits trough probably originated at this time also.

14. TERTIARY VOLCANIC PERIOD.

At some time there was a recurrence of volcanic activity. Probably there were at least two distinct phases, the earlier one being represented by the north-west and north-east basalt sheets, these being thoroughly weathered and dissected, and the later by smaller flows in the Midlands, Derwent Valley, Channel, and other localities in the south. The lava flows of this phase show far less weathering, and their flow down the river valleys may still be traced.

The date of this epoch is doubtful. It is certainly later than the Tertiary sedimentary deposits (e.g., at Wynyard and Launceston). These are classed as Miocene. And it is certainly earlier than the commencement of the glaciation. Pliocene is the tentative date, but from physiographic evidence it could not have long preceded the glacial epoch.

These lava flows are confined to the valleys, with occasional occurrences on mountain summits (e.g., on Mt. Wellington and the Central Plateau). This fact, together with the time of their occurrence, immediately suggests some relation between the volcanic activities and the block-faulting.

It seems reasonable to suppose that towards the close of the period of block-faulting the plutonic earth movements produced a second magma and later squeezed it to the surface. Perhaps it was an unconsolidated residual of the Jurassic magma differentiated to an ultrabasic facies, and squeezed upwards by these later movements. This magma has reached the surface over the base of the synclines, and in one or two localities over the apex of the anticlines—just the places to be expected in circumstances such as I have sketched. The Cygnet alkali rocks can be dated considerably earlier and before the block-faulting period, as they are affected by these movements.

15. THE PLEISTOCENE ICE AGE.

I have previously set out our knowledge of this period, and for the present it is sufficient to draw attention to one feature:—No observation has yet been recorded of isostatic recovery when the ice sheets disappeared. Hell's Gates, on the Davey River, and the terraces behind Strahan may be evidence, but the former may be due to a recent fault and the latter may be outwash aprons. There appears to have been no appreciable upward movement on the Central Plateau or the summits of other large mountain ranges. This is a point which warrants observations in the field.

16. LATER MINOR BLOCK-FAULTING.

There is some evidence of block-faulting of a more recent date than the major period. This has been responsible for such features as Bedlam Walls opposite Risdon, The Rocks, near New Norfolk, Cataract Gorge Launceston, the obvious fault running from Cape Bernier past Eaglehawk Neck, etc. Some recent interruption in drainage is evidenced by such swamps as Tiberius, Lake Dulverton, and Grimes Lagoon, and throughout the country the uneroded interruptions to normal erosion and the presence of cliffs along a fault line indicate a very recent period of faulting. But this was small in extent and has not affected our physiography beyond adding local features.

17. DEVELOPMENT OF OUR PRESENT TOPOGRAPHY.

To summarise, then, the physical outline of Tasmania is framed on blocks of country elevated to varying altitudes and consisting of relatively soft sediments with sills of very hard igneous rock intruded at various horizons. Previous

to this elevation a definite topography had been eroded, the igneous rock modifying this considerably, and this topography was elevated or not according to its position. In the course of the elevation, again, the igneous rock modified the lines of break, and after elevation it largely controlled the rate of erosion. Subsequent to this elevation, the agents of erosion, chiefly frost, snow, and ice, on the highlands have moulded the details of the landscape, and some slight faulting has added a few features locally.

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ON THE PLANTING OF THE DUTCH FLAG IN TASMANIA IN 1642.

By

CLIVE LORD, F.L.S.,

Director of the Tasmanian Museum.

Plates I.-III. and two Text figures.

(Read 14th June, 1926.)

The exact location of the landing place of Tasman's carpenter has excited considerable interest of late years. This has been due, mainly, to the erection of the Tasman Memorial, a work which will ever be to the credit of those responsible for it.

The site of the landing has been the subject of several discussions at meetings of the Society, but it was not until the last meeting of the 1925 session that a paper (Halligan, 1925, pp. 195-202) was read on the subject.

Previous to this Gell (1845, pp. 321-328), Walker (1890, pp. 266-284), and Mault (1892, pp. 408-412) had discussed the matter to a certain degree. In January, 1923, Mr. J. Moore-Robinson contributed an article to the daily press upon the subject, and stated his intention of publishing a paper, but this has not appeared.

TASMAN'S ANCHORAGE.

As a prelude to any discussion concerning the site of the landing it is essential to pay attention to the anchorage of the ships.

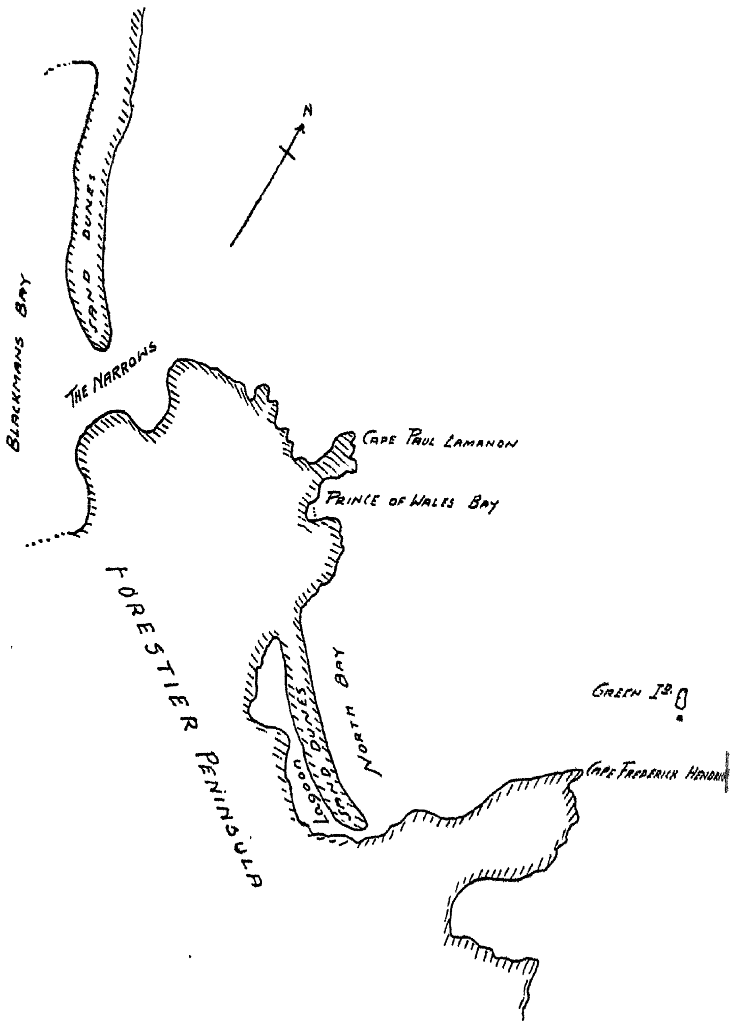
Gell (1845, p. 326) discussed this question, and considered that he was enabled to "fix the spot with the utmost "accuracy." Walker (1890, p. 278) refers to the anchorage as being to the north-west of Green Island.

In the newspaper article referred to previously (Moore-Robinson, *The Mercury*, 22nd January, 1923), the anchorage site is given as:—

South-east extremity of Maria Island N. 36 E.
North-east corner of Green Island S. 76 E.
Most northerly point of Cape Paul Lamanon S. 84 W.
Centre of pebbly beach, Prince of Wales Bay (the landing place) W.S.W.

Captain Bowerman in a report furnished to the Society states: "I might mention that when on the position that I "considered *approximately* Tasman's anchorage I took the "following bearings:—

"S.E. extremity of Maria Island N.E.¾N. (N. 37° E.).
"N.E. extremity of Green Island E. x S¾S (S 76° E.).
"Most northerly part of Cape Paul Lamanon W.½S. (S. 84° W.).



"These bearings were read only to the nearest ¼ "point with the eye from a position on the yacht that was "as far as possible from any local attraction, to reduce the "deviation. The reason I took them was in case anyone ever "wished to check the work the bearings would be handy as "a guide. These bearings do not make a good fix on the "Admiralty Chart, at which I am not surprised, seeing the "coast there is not accurately surveyed."

Mr. Moore-Robinson mentions in his article:—"It was "found that Tasman's bearings, like his observations, were "accurate only in a general sense. He records his variation "as being 3 degrees. It should have been 9 degrees." I am unable to find any authority for this last statement, unless the present compass variation has been accepted as applying to 1642. In comparison, however, with the records of other early navigators, Tasman's variation of 3 degrees appears to be approximately correct. (See also "Isogonic map for the Indian and Pacific Oceans for the epoch 1640." By W. van Bellemen.) In addition, other data have to be taken into consideration, including the various charts, which differ in many details, the interpretation of them, as well as the wording of the Journal. (1)

There is one point worthy of mention which the examination of the charts and sketches discloses, namely, that the *Zeehaen* (2) was anchored nearer to Green Island than the *Heemskirk*, and as observations were made on both vessels this fact may be of service in the interpretation of several items.

Mr. Halligan (1925) has totally disregarded charts and soundings, and assumed Tasman's anchorage as being well inside Green Island. His reasons for this are unconvincing, especially so when he refers to Tasman's skill as a sailor and the law of storms (page 198). The anchorage shown on the plan accompanying his paper (page 199) would have left the Dutch ships on a lee shore in the event of a northerly breeze, which was to be expected, and, as shown by the Journal, did occur later. It is far more probable that Tasman anchored out beyond Green Island near where Marion did in 1772, and, in fact, all evidence seems to support this view, although, in the absence of a detailed marine survey, the position can be fixed in an approximate manner only.

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(1) Apparently Messrs. Kennedy and Moore-Robinson's party worked from Woide's translation, but the later translation by Professor Heeres is generally accepted by historical authorities as being the more accurate and complete.

(2) Tasman's ships were (1) the small war yacht *Heemskirk* (Flag Ship), of 60 tons, and having a crew of 60. (2) The Flute *Zeehaen*, of 100 tons, and a crew of 50 (Flutes were long, narrow ships, quick sailers of shallow draft, and with a good deal of ship room). *Vide* Heeres.

THE LOCATION OF THE SITE WHERE TASMAN'S CARPENTER SWAM ASHORE.

In order to arrive at the correct interpretation of the available data concerning the landing place it is necessary to review certain sections of the account given in Tasman's Journal. Tasman brought his ships to anchor on the evening of the Ist December, 1642. On the following day he sent his pilot major "to a bay situated to the north-west of "us" to examine the land, and further gives the distance as "upwards of one mile," which distance is equal to four English miles. Mr. Halligan (p. 198) claims that had Tasman been anchored east-north-east of Prince of Wales Bay there would have been no bay to the north-west of him, but examining Tasman's log and chart there can be no doubt that the bay which he referred to was the general direction of the present Marion Bay, the curving beach of which would be situated in a north-westerly direction at a distance of about four miles, and no doubt it was the general direction of the outer bay, and not the inner bay, to which Tasman referred. The boats under the command of the pilot major examined the inner bay and reported on it.

As far as we have record, therefore, the small bay inside "The Narrows" marks the spot where the first white people landed on Tasmanian shores.

The explorers returned to the ship, and, among other matters, stated that the land was inhabited probably by giants, owing to the distance apart certain climbing notches were cut in some of the trees. They had also seen smoke from fires in the distance, and heard a sound like a trumpet or small gong. This latter sound was probably the note of the black Bell-magpie (*Strepera fuliginosa*), which occurs in this locality, and has a note that has been likened by Gould to the sound of "a hammer on anvil," and by Littler to that of "a tramway gong." As regards the giants, there was a fixed idea, antedating even the voyage of Quiros, that the great unknown lands of the south were inhabited by giants.

Coming to Tasman's description of the doings on the 3rd December, he states that "we went to the south-east side "of this bay in the same boats as yesterday." Gell (1845) considered that the bay referred to was the south-east side of the present Blackman's Bay. Walker (1890) considered it was the south-east side of the present North Bay. Halli-

gan (1925) is of the same opinion as Walker. The available evidence undoubtedly proves the correctness of Gell's opinion in this respect. (3)

Throughout Tasman's account of his stay on the coast his reference to "the bay" may be taken to mean the bay to the north-west of his anchorage, inside of which was a further bay examined by the ship's boats, the entrance to which may have been in a slightly different position from what it is to-day owing to the shifting nature of the channel through the sandspit. Moreover, Tasman's references to the rocky soil, etc., agree far better with the land inside "The Narrows" than with the land at the entrance of the lagoon at the lower end of North Bay, where the land is sandy, except on the ridge running out towards Cape Frederick Hendrick, which is of rocky formation. The outstanding piece of evidence, however, is given by the charts themselves, for whilst the outline of the inner bay is given in detail, and most of the creeks running into it are shown, yet the shores of North Bay are shown in outline only, and there is not the slightest trace of the lagoon or its outlet. Had Tasman's men been ashore at the outlet and examined the lagoon, there is no doubt that they would have left a description of it and shown it on their charts. The locality visited by the boats in the morning has a bearing on the location where the flag was planted, for the same afternoon the boats attempted to return to the place visited in the morning. Similar words occur in Tasman's Journal as regards the direction taken both in the morning and the afternoon, namely, "we "went to the South East side of this bay." Now, assuming that the boats were making for the entrance to "The Narrows," everything in Tasman's Journal and his descriptions can be reconciled with the present topography of the country, but if, on the other hand, the boats had been making for the outlet of the lagoon at the lower end of North Bay, none of Tasman's statements can be made to agree with the configuration of the coast.

Taking the second case first, if the anchorage as shown on Mr. Halligan's map is correct and we follow the descriptions given by Tasman, it is clear that he would have been half-way from the anchorage to the entrance to the

(3) On another aspect, it is of interest to note that Gell considered that the true Frederick Henry Bay of Tasman was the small cove now known as Prince of Wales Bay. It is generally accepted that the bay referred to was meant for the inlet now known as Blackman's Bay, though there is some evidence that Tasman meant the name to cover the outer as well as the inner bay.

lagoon before it came on to blow strongly from the north, and this would have given a fair breeze into the lagoon; but Tasman refers to one boat pulling back to the ships while the pinnace ran on to an inlet which bore west-south-west of the ships. Mr. Halligan assumes that Tasman landed in the centre of North Bay, and has marked on his map "flag-staff erected here." It is difficult to understand how Mr. Halligan could arrive at this conclusion. Had the boat gone to the lagoon they would have carried on to the lower end, and not made up to the centre of the beach. Moreover, there is no small inlet as mentioned by Tasman in this position. Further, with a northerly breeze a heavy sea with a big break runs in and meets the sandy shore of North Bay. Anyone who has seen the locality in a northerly breeze would recognise immediately that it would be quite impossible for the carpenter to have swum ashore with a staff in such a locality—much more to have ever got back to the boats through the heavy surf and the undertow which sets along the shore. Moreover, there is no sloping ground clothed with giant eucalypts near to these moving sand dunes.

Taking the other case, and assuming Tasman's anchorage as being outside Green Island in the position shown on his chart, the true facts of the case are plain for all to see if a little care and attention are paid to the Journal and the charts and sketches accompanying same (*vide* Heeres' *Tasman*).

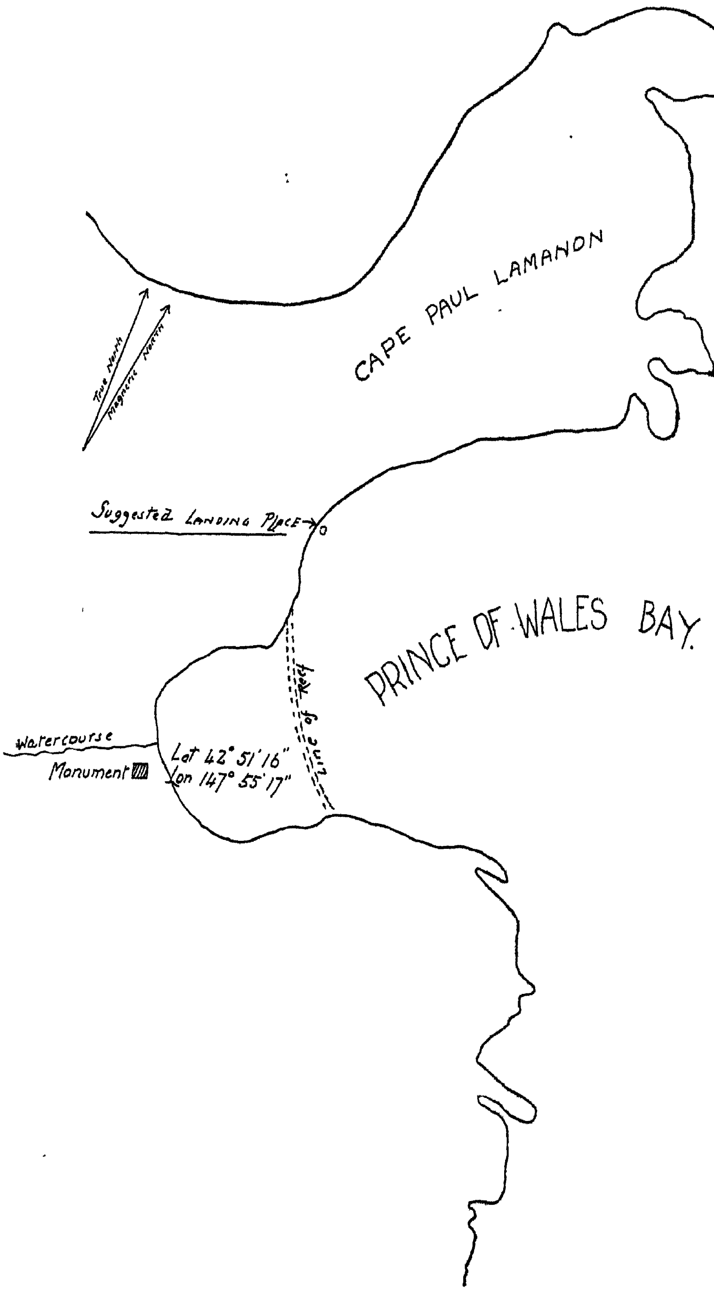
The two boats leaving this anchorage commenced their journey towards "The Narrows," but when half-way, that is, in the vicinity of Cape Paul Lamanon, a northerly breeze came down very strongly, forcing the smaller boat back to the ship, whilst the pinnace was run inshore to where one would anticipate a sailor would make for, namely, under the lee of the high land forming the cape. There appears to be no question that the bay now known as Prince of Wales Bay was the inlet referred to by Tasman as bearing west-south-west of his ships, as it meets with all the conditions as described in his Journal. Moreover, if the sketches accompanying his Journal are compared with the present topography of the land, almost the exact spot where the flag-staff was erected can be easily arrived at, for it is plainly shown as being the north-west shore of the bay.

Prince of Wales Bay is situated at the foot of a steep ridge, one arm of which runs out towards Cape Paul

Lamanon. The bay is quite a small inlet, and towards its head there exists a bar of stone upon which from both sides of the bay there jut out reefs of stones which serve to form an inner cove to the bay. In rough weather the sea breaks upon this with relentless force. It has been said that the reef was formed by the "bay whalers" in order to make a boat harbour, but there can be no doubt as to its natural formation, although the "bay whalers" may have added to it in some degree. It would need an immense amount of labour to make any material difference to the reef, and in the absence of any direct proof the legend that the "bay whalers" built the reef must be viewed with grave doubts. The main part of it is most certainly of natural origin, and it is only a small portion of the superstructure which admits of discussion on this point. A change of structure in the rocks is very noticeable here, and may be largely responsible for the shelf-like reef. A fault can be seen plainly at the base of Cape Paul Lamanon, particularly on the exposed cliff section on the northern face.

Personally, after an exhaustive examination of all available documents, obtaining opinions from authorities in Europe as to charts, etc., and two extended visits to the site, I am of the opinion that the party who made the original selection for the site of the monument (*vide Mercury*, 22/1/1923) failed to locate the correct position on the landing place of Tasman's carpenter, and also that the position as marked by Mr. Halligan is equally at variance with the evidence.

Considering that the wind was blowing strongly from the north (not from the east as some authorities have stated), there would be a great break on the reef, particularly as, according to certain calculations, the tide was low. (Halligan, p. 202.) Tasman refers to the surf, so that it is extremely unlikely that his boats would have crossed the bar, especially as the northern shore of the bay would be more sheltered. Moreover, the sketch in Tasman's Journal definitely shows the flag on the northern shore of the bay, and the description of the sloping ground agrees far better with this position than with that at the head of the inner cove. It is questionable if there are any traces left of the original trees noted by Tasman, but it is easy to find four stumps in either position. A comparison of a recent survey of the bay with one made over half a century ago shows a fair amount of erosion of the inner northern shore of the



CAPE PAUL LAMANON
True North
Magnetic North
Suggested Landing Place
PRINCE OF WALES BAY.
Line of Reef
Watercourse
Monument
Lat 42° 51' 16"
Lon 147° 55' 17"

Fig. 1.—Outer Cove, Prince of Wales Bay, in Northerly breeze, showing calmer water under lee of Cape Paul Lamanon.

Fig. 2.—The suggested site of the landing on the Northern shore of Prince of Wales Bay.

Fig. 3.—The Reef, Inner Cove, Prince of Wales Bay. Green Island in distance.

Fig. 4.—Looking North across the Bay, showing break on Reef.

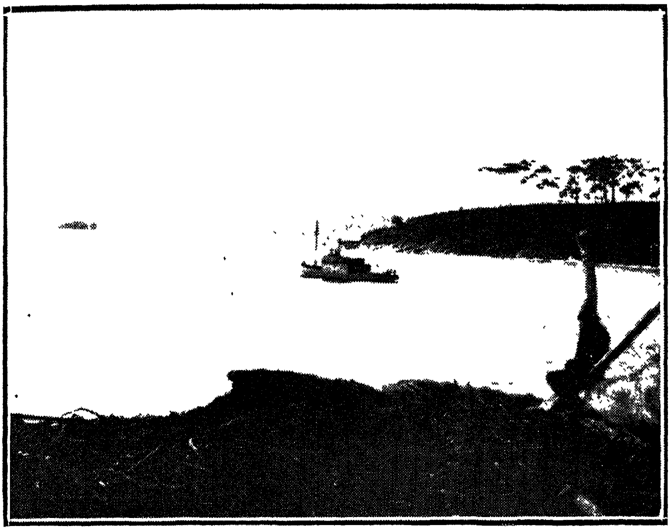


Fig. 5.—Prince of Wales Bay, looking South-East. Green Island and Cape Frederick Hendrick in distance.

Fig. 6.—The Entrance to the lagoon, North Bay.

Clive Lord, Photos.

bay, and down among the shingle on the beach just outside the reef remains the enormous stump of a very old eucalypt. If any tree might have a claim as being Tasman's tree, I think that this one might well be considered, for, so far as I can gather from the available evidence, it occurs just at the spot where the carpenter apparently swam ashore. Moreover, it is just as easy to find four stumps here as in the position at the head of the bay, but considering the lapse of time too much reliance should not be placed on trees.

It is of interest to note that Gell (p. 326), in describing the cove now known as Prince of Wales Bay, wrote as follows:—"Nearer its northern than southern extremity the "sea has cast up a key of large grey rounded ironstones "which interrupts the curve of the beach, and doubtless "marks the very spot where the carpenter swam ashore."

Walker wrote:—"Standing just outside the shingle bar "at the entrance to this inner cove it needs no great effort "of imagination to call up the scene on that 3rd December, "1642."

Taking these opinions, together with the sketches in Tasman's Journal, into consideration, it is difficult to understand how many of the statements made in regard to the landing came to be written.

The discussions in regard to the site have been of value, and should assist in enhancing interest in the early history of our island State. Too much credit cannot be given to those who made the erection of the Tasman Memorial possible, and any criticisms in regard to the interpretation of historical or scientific data are quite apart from the erection of the memorial. It is to be hoped that other memorials will be erected in the near future. The visits of such navigators as Furneaux, Cook, Bligh, D'Entrecasteaux, and Baudin are well worthy of commemoration.

EXPLANATION OF PLATES.

PLATE I.

Fig. 1.—Outer Cove, Prince of Wales Bay, in northerly breeze, showing calmer water under lee of Cape Paul Lamanon.

Fig. 2.—The suggested site of the landing on the northern shore of Prince of Wales Bay.

PLATE II.

Fig. 3.—The Reef, inner cove, Prince of Wales Bay. Green Island in distance.

Fig. 4.—Looking North across the Bay, showing break on Reef.

PLATE III.

Fig. 5.—Prince of Wales Bay, looking East. Green Island and Cape Frederick Hendrick in distance.

Fig. 6.—The entrance to the lagoon, North Bay. Cape Bernier and Maria Island in distance.

Clive Lord, Photos.

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NOTES ON THE CONSTITUTIONAL SEPARATION OF TASMANIA FROM NEW SOUTH WALES

(3rd December, 1825).

By

JOHN REYNOLDS.

(Read 9th August, 1926.)

In the year 1824 public opinion in Tasmania first forcibly expressed itself on a political question. The colony had passed the elementary stage of its growth, and a change in the form of government was necessary for its well-being and future development. No longer was it desirable that it should be ruled by a Governor at Sydney, who was possessed of almost autocratic powers. At the very most the Tasmanian Lieutenant-Governors were merely his subordinates, and the colony was feeling the ill-effects arising from the limited scope of local authority.

Fortune favoured the colony in two respects at this period. Firstly, the prominent colonists clearly discerned the nature of their troubles, and were capable of acting together to obtain their removal. Secondly, the British Government recognising that eventually a change in the administration would be necessary, had made provision for effecting it at some future date. The fact that the machinery for the removal of their disabilities had been made, but was placed, as it were, in storage for future use, roused the colonists to action. After preliminary meetings, a petition was drawn up for presentation to H.M. King George IV. The petitioners prayed that the section of the Act 4 *Geo. IV.*, which provided for the erection of the colony of Van Diemen's Land completely separated from New South Wales should become effective. Provision in the Act had also been made for the appointment of nominated executive and legislative councils to assist in the government of the colony. The petition was not lengthy, and was signed by over a hundred colonists, including nearly all the leading settlers, merchants, and magistrates. Within the limits of the following paragraph the petitioners confined the main statement of their case.

"That, although the people of this Island have had "to combat with all the difficulties incident to a new "country, without many of the aids and facilities enjoyed "by Colonists of New South Wales, they have neverthe-"less made proportionately greater advances. But, as, "in Soil, Climate, and Geographical relation, this Island "essentially differs from that Country, as its present "State, moral and physical, cannot be referred to the "same Causes, neither can their future welfare and pros-"perity be identified with or promoted by the same policy "and measures, and which, however applicable and ad-"vantageous they may be to that Settlement, have been "recently felt alike unsuited to the condition and pre-"judicial to the welfare of this Colony." (1)

It is quite plain what the petitioners wanted, but their statements concerning their political disabilities are not nearly so definite. Nevertheless, they satisfied the British Colonial authorities, who were well supplied with official information on the subject. This petition is one of Tasmania's most interesting public documents. The achievement of its object had a far-reaching effect, so naturally we want to know more of the circumstances which brought it into being. An examination of the extant historical documents and papers of the years immediately preceding 1824 does not furnish an adequate view of the position. For this it is necessary to go right back to the foundation of the colony. From a brief review of the relations between the successive Governors of New South Wales and their subordinates in Tasmania this in some measure can be obtained. Owing to the personal nature of the Government, these men guided the destinies of the colony, so their actions were of great consequence.

When Governor King despatched the first party to settle in Tasmania, it was most necessary for him to keep a very close supervision over the Commandant (Lieutenant John Bowen, R.N.). He was acting on his own initiative. The fear of the French annexation seemed confirmed by the presence in Tasmanian waters of Commodore Baudin's ships, and several American sealing ships hovered around the islands in Bass Straits, making themselves a nuisance to the penal settlements. It is not surprising that among other

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(1) Memorial to H.M. King: Hist. Rec. Aust., Vol. 3, Ser. III., pp. 578-80.

clearly defined instructions he gave the following to the youthful commandant:—

> "You are not to permit any intercourse, or trade, "with any ships or vessels that may stop at Van Diemen's "Land, whether English or of any other nation, unless "such ships or vessels should be in distress, in which case "you will afford them such assistance as may be in your "power." (2)

This is a good example of an application of the great powers that a Governor of New South Wales possessed.

King, as Governor of New South Wales and its Dependencies (including Tasmania), was indeed possessed of very wide powers. He legislated, administered, and almost controlled the judiciary. (3) His successors until 1823 held the same powers, but possibly a little diminished in the latter sphere. So to all intents and purposes their will was law in matters concerning Tasmania.

Colonel David Collins with an expedition from England and Colonel W. Paterson with one from Sydney followed in Bowen's unfortunate steps. Their arrival marks the definite foundation of the colony in the south and north of the Island. King's relations with each of these men were excellent from an administrative point of view. (4) Undoubtedly he fully appreciated the nature of the task of planting a new colony, as he had gained similar experience at Norfolk Island. Collins was in particular allowed a considerable freedom of action, and received every assistance from his superior. This was the only conceivable way that such a system of government could work efficiently and smoothly.

Captain William Bligh, King's successor, had very little to do with Tasmanian affairs. During the famine of 1808 he assured Collins that the Tasmanian colonists would suffer no more than their brethren in New South Wales. After his deposition he visited Hobart and attempted to govern, but his actions were repudiated by Collins, and have no interest at present.

The Sydney Governors legislated by means of proclamations and general orders. Many of these edicts contained legis-

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(2) King to Bowen: Hist. Rec. N.S.W., Vol. 5, p. 76.

(3) King's commission: Hist. Rec. Aust., Vol. 3, Ser. I., pp. 384-90.

(4) King's instructions to Paterson: Hist. Rec. Aust., Vol. 1, Ser. III., p. 601.

lation beneficial to both colonies, but it is not hard to find instances where their application to Tasmania was harmful and even ludicrous. The inability of the Governor-in-Chief to calculate the effects of his legislation, however good for New South Wales, upon Tasmania was one of the worst defects of the system. Unfortunately, the only Governor who had a first-hand acquaintance with Tasmanian affairs (Macquarie) handled them the worst.

From 1813 to 1817 this delicate system could hardly have been in the hands of worse operators. Colonel Lachlan Macquarie was the Governor-in-Chief and Colonel Thomas Davey the Lieutenant-Governor of Tasmania. Macquarie was in many respects a remarkable man. Energetic and efficient in administration, exemplary in private life, but arbitrary in his actions to the point of tyranny.

Davey, his subordinate, differed from him in almost every respect. Easy-going and inefficient in administration, good-natured and dissolute in his private affairs. Macquarie owed his position to ability, Davey to influence. At the commencement of Davey's term of office, Macquarie, being well informed of his subordinate's ways, prepared for him a lengthy list of instructions. (5) In them he narrowly defined Davey's discretionary powers. Every item of Government expenditure had not only to be reported, but justified. Without Macquarie's sanction he was not allowed to charter ships, enter into contracts for supplies, grant lands, erect buildings, or alienate live stock. Two instances will be given to demonstrate how the colony suffered through the inability of these two men to work together and follow the example of their predecessors, King and Collins.

(1) The inability of Davey, or his commissariat officers, to draw bills on the Treasury for payment of supplies purchased was a serious handicap to the colony. It meant that the drafts they gave were only payable at Sydney. Before a settler or merchant received his payment for the produce he had sold, weeks or even months might elapse. In the meantime, his creditors had to wait. This obstruction to commerce had a detrimental effect on the progress of the colony.

(2) It was the misfortune of the colony that just at the period when the wheels of government were not running at

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(5) Macquarie to Davey: Hist. Rec. Aust., Vol. 2, Ser. III., pp. 13-23.

all smoothly, a very serious trouble should arise. Since the earliest days of the settlement there had been always a few lawless men, ex-convicts and others, wandering in the bush, living by robbery and practising all kinds of violence. With no Criminal Court in the colony, so that all offenders had to be sent to Sydney for trial, the moral effect of immediate punishment was lost. In 1815 bushranging had increased to such an extent that all the settlements were in danger of being plundered. One chieftain of a band of desperadoes audaciously challenged Davey's authority. To meet the situation Davey took the only course open to him. He proclaimed Martial Law. (6) The results seem to have justified his action, and the settlers expressed their appreciation of Davey's action in the form of an address. (7) Now, although Davey had a good colonial precedent for his action, Macquarie condemned it. Later he admitted that Davey's action was correct.

In this period there were many examples which demonstrated the defects of the Dependency system of government. One of the most outstanding of these is given below. It will be seen that in this case no blame can be laid on the shoulders of Davey. For its revenue, the administration in Tasmania depended mainly upon duties imposed on imported spirits. From this source came the money to pay for developmental work, such as the clearing of land, road-making, and building. Macquarie, probably without considering the effects of his action, deprived the colony of this useful financial asset. He entered into an agreement with three Sydney men, whereby they built a Government Hospital at that place for the privilege of importing all spirits into the colonies for four years. (8) All importing was done through Sydney. Davey strongly protested to the Earl of Bathurst, the Secretary of State for the Colonies, but without result. (9) Development work, so necessary for the young colony, appears to have come to a standstill whilst the monopoly lasted.

After four years of official wrangling and hard living Davey was succeeded by Colonel William Sorell. The new Lieutenant-Governor was not merely an excellent administrator, but also possessed the qualities of a far-sighted states-

(6) Hist. Rec. Aust., Vol. 8, Ser. I., pp. 133-4.
(7) Address to Davey: Hist. Rec. Aust., Vol. 2. Ser. III., pp. 133-4.
(8) Hist. Rec. Aust., Vol. 7, Ser. I., pp. 401-5.
(9) Davey to Bathurst: Hist. Rec. Aust., Vol. 2, Ser. III., p. 149.

man. He was able to work with Macquarie, and during his term of office the colony advanced at great strides. Nevertheless, Macquarie did not see fit to grant him the same freedom of action that Collins had enjoyed. However, Sorell did manage to effect one partial reform. By an arrangement, the Deputy-Commissary General in New South Wales allowed his subordinate in Tasmania to draw bills directly on H.M. Treasury to pay for supplies bought. This was only a departmental arrangement, and depended upon the degree of trust existing between the two officers; at any time it might be terminated. Sorell estimated that the community was thus saved to the extent of 25 per cent. in its financial dealings. (10)

Macquarie in his turn was succeeded by Sir Thomas Brisbane. This change of Governors-in-Chief did not greatly affect Tasmanian affairs. With the large numbers of free emigrants who were arriving the roundabout method of granting lands from Sydney was becoming more difficult to work and causing much inconvenience and delay. It was Brisbane's misfortune to have to introduce a number of necessary but unpopular reforms. He made sweeping changes in the currency, and introduced a new system of purchasing supplies. These measures gave rise to vigorous opposition in New South Wales. They applied equally to both colonies, so could not be considered a special grievance of Tasmania. No doubt their introduction did help in Tasmania to fan the flames of dissatisfaction with the state of affairs.

To return to the petitioners. A few of them had witnessed the best working of the system in the days of Collins. A far greater number had seen only the days of Davey. Probably many were then new settlers, and in the days of their pioneering struggles had to suffer what was, in many respects, gross misgovernment. Whilst this system remained, no matter what beneficial arrangements for smooth working were made between the authorities, there was always a possibility of a recurrence of that evil.

The prayer of the colonists did not fall upon deaf ears. The British Government took steps to fulfil their wishes almost immediately. When Brisbane retired it was decided that Lieutenant-General Sir Ralph Darling should succeed him. When Darling left England he was given two commissions, one appointing him Governor of New South Wales,

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(10) Sorell to Bathurst: Hist. Rec. Aust., Vol. 4, Ser. III., p. 577.

the other one appointing him Governor of Tasmania. (11) On the voyage out Darling called at Hobart, arriving on the 24th of November, 1825. During the next nine days all arrangements were made for the various ceremonies which were officially to mark the change in the system of government. At last the eventful 3rd of December arrived. Darling took the various oaths of office, and so became Governor of Tasmania. He immediately issued a proclamation, which is extant, announcing the separation of the colony from New South Wales. But Darling had no intention of remaining in the colony, and on the 5th of December he left to take up his duties in New South Wales. Lieutenant-Governor Arthur (who had succeeded Sorell) thus became Acting-Governor after taking the oaths of office. On the 12th of December Arthur issued a proclamation appointing the first nominated executive and legislative councils.

The passing of the cumbrous Dependency system of government, of the unchecked powers of the Governors and the growing strength of public opinion, were signs that the little craft of state was entering upon new waters. The old problems of government prior to 1825 mainly disappeared and were forgotten, and the path was cleared for the solution of the new ones which quickly arose. Outstanding among these were the aboriginal question, the freedom of the press, the raising of revenue, and the transportation system. So the citizens of Hobart who illuminated their dwellings and lit bonfires on the night of 3rd December, 1825, were rightly celebrating the birth of a new era in the history of their country.

The writer wishes to record his appreciation of the assistance he has received from Mr. W. F. Dennis Butler in the writing of this paper.

(11) Darling's commission: Hist. Rec. Aust., Vol. 5, Ser. III., p. 1.

THE OIL SHALES OF TASMANIA.

By

A. McIntosh Reid

(Director of Mines).

(Read 14th June, 1926.)

INTRODUCTION.

It was the original purpose of the writer to deal with the two types of shale, namely, tasmanite and the so-called torbanites or kerosene shales, but as the subject assumed such large proportions it was decided to confine attention to tasmanite only. Much research is still necessary in order to decipher the problems unsolved relating to the actual nature of the oil-producing organic matter and also to the nature of the oils produced in the processes of distillation. The information contained herein, whilst adding to our general knowledge of the subject, should prove an incentive to further investigation.

HISTORY OF DISCOVERY AND DEVELOPMENT.

The name of the discoverer of oil shale in Tasmania was not recorded in the annals of that time. The earliest account appears in the "Papers and Proceedings of the Royal Society of Van Diemen's Land" in a paper read by J. Milligan in the year 1851. Since its discovery so many years ago the deposits have continued to excite the attention of scientists as evinced by the large number of contributions to our knowledge from the pens of many investigators; but until recent years it has proved of passing interest only to investors, as its exploitation was not considered a commercial possibility. In the early nineties a local company was formed to explore the seam and determine the value of the shale as a source of oil. The early history of the industry is essentially the history of the operations of that company. After an expenditure of many thousands of pounds without return the present members of this company remain hopeful, and expect soon to receive the reward of their patient industry. A

number of companies hold shale interests in Tasmania to-day, one of which, the Australian Shale Oil Company, has erected a very large plant, and has opened another area for mining. It is expected that the plant will be put into operation this month. If crude oil can be produced from the great shale deposits of Tasmania by the utilisation of the Bronder process as cheap as the average cost of production of drilled wells, then the operation on a large scale of the shale deposits must prove a very attractive proposition and one which must command attention in the very near future.

There is, as will be shown later, a genetical association between the two important types of oil-producing shale in Tasmania; therefore, one is regarded as an indication of the near presence of the other, yet the two are never found superimposed. Investigation shows that the shales are found in disconnected basins situated in the north and north-central parts of Tasmania, associated with kerogenite and humic-kerogenite coals. The most important is that extending from Latrobe to Quamby Bluff and Chudleigh. From Latrobe the seam has been traced to Railton, Nook, Parramatta, Kimberley, Deloraine, Osmaston, Beulah, Cheshunt, and Chudleigh. Outcrops are found in each area named. From Latrobe the seam has been traced without serious interruption under the broad flood-plain and valley sides of Mersey River to a point three miles south-east of Kimberley. Between Kimberley and Deloraine the shale series of rocks are covered with basalt lava and ash, but they reappear again a mile south of Deloraine, and are well exposed at Osmaston. Remote from these are the Cam River bed of tasmanite, exposed near Henrietta and Oonah, and the so-called torbanites of Preolenna and Mt. Pelion. The Henrietta tasmanite and Preolenna torbanite (kerogenite and humic-kerogenite coals) are directly connected, but the Mt. Pelion seam is far distant, and apparently lies at a slightly higher horizon in the formation than the others.

GEOLOGICAL HORIZON.

The tasmanite shale seam and the associated bed of coal lie at the same horizon in the Permo-Carboniferous formation. In the coal portion of the basins land and freshwater beds are intercalated between Lower Marine and Upper Marine mudstones; but in the tasmanite portion the Lower Marine and Upper Marine form a continuous series uninterrupted by land or freshwater deposits. Long it

was doubtful whether the shale and coal seams were homologous, but recent investigation sets all doubt aside. Early observers noted that in the marine beds above the coal seam fossils are found similar to those in the beds above the shale (tasmanite), and below the shale pebbly mudstone passing down into a basal conglomerate prevails just as happens below the coal seam. The fossils above and below the bed of shale and coal are identical, and all are marine or open estuarine. In boring for oil shale near Latrobe it was found that there is an intergraduation from shale to coal. At Nook the bed of shale abuts against the coal seam on two sides. In the bed of Don River below Bott Gorge is a thick seam of black coaly shale which differs in many important particulars from tasmanite, and apparently marks the transition between it and the humic-kerogenite coal of the region, for, in addition to sporangia of tasmanite, it contains black coaly matter derived probably from another order of plants. The Don Valley black shale cannot be lighted as readily as tasmanite, but the characteristic odour of the latter is given off in burning. Even with the aid of the microscope the structure of this material cannot be perceived. It is interesting to note that the shale layers are separated here as elsewhere by a band of almost barren mudstone.

At Chudleigh, not far from the Cheshunt bed of tasmanite, coaly matter similarly charged with sporangia has been found. In further confirmation, the writer has found thin bands of coal, brittle and of pitch-like lustre, encased in or attached to tasmanite shale at Latrobe. It is noteworthy that the relative proportion of volatile hydrocarbons to fixed carbon is 1 to 1 in this coal as in the main body of coal in the fields of Spreyton, Tarleton, and Dulverton. It is remarkable that where tasmanite is nearby torbanite is not found in direct association with humic-kerogenite (cannel) coal. Yet torbanite-like shales are found below Bott Gorge and at Chudleigh replete with the sporangia of tasmanite. The inference is that sporangia of the marine deposit tasmanite are one of the chief components of torbanite with, perhaps, a far larger proportion of pollen. There is also an intergradation of torbanite to cannel (humic-kerogenite) coal as there is from tasmanite to cannel coal. The gradations may be expressed in the following degrees—tasmanite, black carbonaceous shale of Don Valley class, torbanite or kerosene shale, cannel or humic-kerogenite coal.

THE SHALE BED.

The tasmanite seam is 5 to 7 feet thick, and lies at or about the horizon of the coal bed in contiguous areas. Only one seam of tasmanite and only one seam of coal is known where the two are closely connected. There is no evidence to show that tasmanite and coal are anywhere mutually superimposed; on the contrary, it is known that where coal is found it is futile to search for tasmanite, and where tasmanite is found, for coal. This knowledge facilitates exploration considerably by the elimination of all coal areas from examination. It has been established that the seam of tasmanite fringes the shore-line of the Permo-Carboniferous sea, from which it follows that where the upper marine mudstones abut early Palæozoic and Proterozoic rocks the presence of tasmanite may be anticipated.

A rather striking feature is that there is no noticeable thinning of the seam as the shore line is approached. This is due in part to the steep slope of the shore rock and to the fact that the materials of which the shale is composed were deposited in waters not less than 10 feet deep. The arenaceous muds and sporangia forming the bed of shale were deposited in shallow waters along the shores of islands or in estuaries. It is noteworthy that the shale bed in every locality consists of two main layers separated by a band of mudstone, one to two feet thick, similar to that in which the shale is encased, thus indicating similar conditions of formation and direct association. The separating mudstone band contains tasmanite sporangia, but the roof and floor mudstone are almost devoid of them. Embedded in the shale are numerous well-rounded pebbles and boulders of quartzite, conglomerate, chert, schist, and quartz, many very pyritic. These large inclusions vary in size from marbles to boulders two feet in diameter. The large boulders are subangular and evidently were precipitated into the sea from nearby shore hills. Where the shale enwraps the pebbles and boulders it appears more compressed and closely laminated. In many places the calcite of the marine fossil has been completely replaced by pyrite. Secondary pyrite is abundant also in the rock pebbles and nodules, and veinlets are not uncommon in the body of the shale. The nature of the discs in the shale was discovered by R. M. Johnston, and was first recorded by him in *Field Memoranda for Tasmanian Botanists*, published in 1874. Johnston states that "tasmanite is the product of "the spores and sporangia of certain crytogams allied to the "club-mosses, and that the sporangia were washed down by

"an ancient muddy river and deposited in the quiet bottom "of an inlet of the Upper Palæozoic sea, and among the "sediments thus deposited marine organisms lived and died."

The following is an incomplete list of the marine fossils that have been found in the shale:—

Spirifera tasmaniensis (Morris).
Cardiamorpha gryphoides (De Kon).
Pachydomus hobartensis (Johnston).
Pleurotomaria morrisiana (McCoy).
Pleurotomaria woodsii (Johnston).
Pteronites latus (De Kon).
Aviculopecten latrobensis (Johnston).
Aviculopecten subquinquelineatus (McCoy).
Aviculopecten fittoni (Morris).
Aviculopecten sprentii (Johnston).
Eurydesma hobartense (Johnston).
Keeneia twelvetreesi (Dun).
Orthotites (Fischer).

NATURE OF TASMANITE.

Tasmanite, like kerogenite and humic-kerogenite coals (the so-called kerosene shale and cannel), is not an oil-bearing but an oil-producing substance, that is to say, there is no free oil in the material. That marks the distinction between oil shale and oil sands. In oil sands the oil is contained in the sand as oil. In shale there is no oil as such, but the substance is in it from which oil can be generated. Oils cannot be extracted from it by solvents nor by subjecting the material to high pressure, but oils can be formed from it by the application of heat under suitable conditions. The source of the oil is an organic substance called "Kerogen," with which the shale is impregnated. This organic material is of vegetable origin, and may be regarded as a concrete fixed oil. Yet, it does not follow that there is any direct relation between natural petroleums and the kerogenous materials of oil shale. In fact, it is generally believed that natural petroleums are not of vegetable origin. Shale is essentially a mineral product consisting largely of hardened arenaceous muds, in which are embedded certain fossil hydrocarbons not uncommonly found in the Permo-Carboniferous formation. Kerogenous shales are found in the Permo-Carboniferous of

many countries, and also in later formations. They differ considerably, the difference being due largely to the variation in the conditions under which they were laid down and preserved and to variation in the nature of the plant remains of which they were formed. Some are marine deposits, others are terrestrial; some consist largely of the waxy covering of spore cases, some of pollen and other plant remains in addition. The kerogenous material of tasmanite, so adapted to the generation of artificial petroleum by distillation, consists of the waxy covering of minute disc-shaped spore cases, which are set in a fine-grained arenaceous sediment. The amber-coloured discs or sacs are about half a millimetre in diameter, and, if not deformed, are nearly circular in outline. They appear as flattened bodies pressed together in overlapping layers, and can be separated easily by the insertion of a sharp instrument between them. Under the microscope they appear contorniate, the harder rim part being marked in most cases by black carbonaceous material. Twelvetrees presents the following description: "In transmitted light they are transparent, with a peripheral external wall crowded with rod-like wedge or gash-shaped cavities of minute size, disposed for the most part subradically within each sac or spore case, and suggestive of the presence of some cellular structure, faint traces of which are occasionally revealed." The spore cases have been preserved by a decay-resistant waxy or resinous substance forming the outer skin, but the spores have decayed, and their remains are generally almost indistinguishable, except for a little black carbonaceous material marking the division between the cutaneous waxy covering. However, the nature of the spore sac is clearly revealed in the less deformed specimens. The sporangites or wax-like spore exines (walls) compose the bulk of the oil-producing material, and represent the protective covering of the spores of a plant probably of lycopod relation and allied to present day club-mosses. It is pointed out by Johnston that the spores, evidently, had been discharged, as almost every sac appeared to be fractured as if rent asunder by internal force. These waxy or resinous products of the plant are hydrogen-rich and oxygen-poor substances. The kerogen of these shales, then, consists of the sporangia or spore cases of a supposed lycopodiaceous plant termed by Professor Newton, of the British Museum, *tasmanite punctatus*. The structure of modern club-mosses (lycopods) furnished a feasible explanation of the origin and nature of the fossil remains.

Stewart, a Scottish investigator, obtained a substance similar to shale oil by the distillation of a mixture of 25 per cent. lycopodium spore dust and 75 per cent. of fuller's earth.

PHYSICAL PROPERTIES OF TASMANITE.

Colour—Light yellow or amber when fresh; dark brown on exposed surfaces, grey on weathered surfaces. Lustre—Resinous to pearly. Texture—Finely laminated fissile; weathered shale splits into thin flexible paper-like sheets. Fracture—The material is tough and sectile. It breaks unevenly and with great difficulty across the plane of bedding. Weathering—The shale withstands weathering remarkably, and exposures stand out prominently from the encasing mudstone. The effect of weathering on the oil yield is inappreciable. Specific Gravity—The specific gravity varies from 1.2 to 1.6, the richer layers having the lower value. Hardness—This property varies according to the degree of richness, the average being 1. Flexibility—In thin sheets the shale is capable of being bent through a large arc without breaking. This property is increased by submersion in boiling water. Solubility—Almost, if not quite, insoluble in ether, pyridine, benzine, and carbon bisulphide; unlike ordinary resins and waxes, it is only slightly soluble in alcohol. It is not acted on by HCl; slowly oxidised by HNO_3; readily carbonised by H_2SO_4 with evolution of H_2S. Fusibility—The shale ignites readily with a match, and continues to burn freely when removed from the external source of heat. In burning at that temperature it produces a large volume of black sooty smoke, and gives off a strong unpleasant odour.

CHEMICAL COMPOSITION OF TASMANITE.

When the shale is placed in a retort and subjected to heat, the organic component is progressively decomposed into permanent gases and oil vapours of various kinds, the latter of which can be easily condensed into crude shale oil. The richness of the shale is in proportion to the amount of kerogen it contains or in proportion to the number of sporangia. It is remarkable that although the richness of the shale varies from the top to the bottom of the seam the variation is similar in every shale area, and the average oil content remains constant. The upper part of the seam is richer than the lower in every area, yet the average content of oil in the material as a whole remains between 40 and 45 gallons per ton of shale.

The following proximate analysis of shale from Latrobe area may be taken as a fair indication of the composition:—

Moisture	0.80	per cent.
Volatile Matter	30.84	„ „
Fixed Carbon	5.86	„ „
Sulphur	2.56	„ „
Ash	62.50	„ „

The fixed carbon probably represents the black carbonaceous matter of the sac walls already referred to. A portion of the amount, however, may have been derived from the kerogenous material owing to inefficient distillation. It is possible, for instance, that in the process of distillation and the formation of permanent gases and light gasolene surplus carbon was liberated. Tasmanite is distinguished from many similar plant remains by the high proportion of sulphur it contains in combination with its carbon and hydrogen. The distillate from these shales has the strong penetrating odour of sulphuretted hydrogen and also of carbon bisulphide. Evidently the greater part of the sulphur in that compound represents the amount originally contained in the body of the plant from which the pyrobituminous matter was derived. Extrinsic sulphur in combination with iron as pyrite and marcasite is a common accessory component of the shale, and in the process of conversion of kerogen to oil some of it may have entered into combination with hydrogen and carbon. An ultimate analysis of the crude oil revealed its composition as follows:—

Nitrogen	0.31	per cent.
Hydrogen	10.41	„ „
Oxygen	4.93	„ „
Carbon	79.34	„ „
Sulphur	4.93	„ „

From a number of analyses Church arrived at the empirical formula $C_{40}H_{64}O_2S$, and suggested that the material may be a derivative of turpentine $C_{20}H_{32}$, or the radicle he assumed them to contain may be a homologue of benzoyle $C_7H_5O + 13\ CH_2 = C_{20}H_{31}O$. It is doubtful whether the kerogen of tasmanite can be expressed as a definite chemical compound; the relative proportion of the constituents, however, can be expressed as a constant if sulphur is disregarded. The calorific value of the crude oil has been estimated at 21625 to 21336 B.T.U.; the flash-point from 235 deg. to 260 deg.; and the specific gravity from

0.931 to 0.956. The crude oil remains fluid at the lowest natural temperature of the atmosphere. In the process of distillation the following products are obtained:—

Permanent gases and gasolene ..	10.00	per cent.
Benzine	10	„ „
Fuel oil	80	„ „

By fractional distillation the fuel oil may be converted into

Lighting oils	25	per cent.
Lubricating oils	30	„ „
Tar	28	„ „

The viscosity of the lubricating oil has not been determined, but apparently it is not high, and the oil is not of standard quality. The fuel oil may be used to advantage in internal combustion engines, or as a fuel for the generation of steam, or it may be "cracked" into benzine and residual tar. The oil derivable from tasmanite is of asphaltic base, whereas that from the so-called torbanite and pelionite shales is of paraffin base. The nitrogen content of tasmanite is so small that it may be disregarded. However, it may prove of some value as a fertilising agent if discharged as a constituent of ammonium sulphate into the spent shale which contains other components of plant food. Tasmanite contains a small amount of potash and of soda, and a little phosphoric acid. Applied as a poor fertiliser, the spent shale may prove of some value also as a mechanical agent in breaking up the stiff basaltic soils of the neighbourhood. The following is an analysis of spent shale:—

Carbon	11.0	per cent.
Titania	0.40	„ „
Soda	1.57	„ „
Potash	1.93	„ „
Silica	64.80	„ „
Alumina	12.02	„ „
Ferric oxide	3.58	„ „
Lime	1.00	„ „
Magnesia	1.74	„ „

QUANTITY OF SHALE AVAILABLE.

In all the explored areas sufficient data are available for accurate calculation of the shale reserve. There are, however, certain untested areas in addition which are re-

garded as potential sources of shale, and, therefore, deserve attention. The total tonnage of shale in the several areas is estimated as follows:—

Actual Reserve.	Probable Reserve.
17,000,000	27,000,000

UTILISATION.

The first question for consideration is whether it is advisable to market the fuel oil portion as such, or whether it is advantageous to crack the fuel oil into benzine and tar. In this connection it will prove of interest to note the results of researches performed by Dr. Gustav Egloff, of Chicago, on anti-knock motor fuels. To begin, it may be stated that one of the most important problems in the oil industry to-day is the production of anti-knock motor fuels. Normal straight-run gasolines produced from some oil fields develop the familiar knocking sound in an automotive engine when labouring on hills, with wide-open throttle. For many years it has been believed that straight-run gasolines from paraffin base or semi-asphaltic base oils were superior motor fuels. Since, however, the advent of the commercial cracking of heavy oils into cracked gasolene this position is no longer tenable, for the cracking reaction can be so controlled that anti-knock motor fuels can be produced of superior qualities to straight-run gasoline. Paraffin hydrocarbons vaporised with air detonate with an explosion velocity far beyond that of the normal burning wave. The high velocity of explosion gives a hammer-blow in the cylinder instead of propulsive force, and the high explosion wave gives rise to the familiar sound of knocking in the motor engine when operating at low speed when the motor is on an ascending grade.

The napthene hydrocarbons in gasoline have anti-knock properties which enhance their value, and the aromatic series are so particularly endowed that they are the best compounds derivable from crude oils. The unsaturated hydrocarbons of the clefin series are excellent anti-knock compounds and have important qualities for that reason as motor fuels.

Tests have shown that the straight-run benzine and the cracked fuel oil derived from tasmanite contain oils of the aromatic series, and that the benzine so produced has proved an excellent motor fuel.

STUDIES IN TASMANIAN SPIDERS.

Part I.

By

V. V. HICKMAN, B.Sc. (Tas.).

Plates IV. to X. and Twenty Text Figures.

(Read 11th October, 1926.)

The following paper deals with material collected in both the north and the south of Tasmania. Six new species are described. Among the *Aviculavidæ*, two very interesting genera are represented, namely *Migas* and *Hexathele*, both of which are typical New Zealand genera.

Family AVICULARIDÆ.

Sub-Family MIGINÆ.

Genus *Migas* (L. Koch).

The type of this genus is *Migas paradoxus* (L. Koch) (1), found in New Zealand. A mutilated spider collected by the Horn Scientific Expedition to Central Australia (2), and identified by H. R. Hogg as probably *Migas paradoxus*, is the only specimen of this genus recorded from Australia. Owing to the imperfect condition of the specimen it could not be identified with certainty, and considerable doubt exists as to whether the genus does occur in Australia. Goyen (3) has described other New Zealand species belonging to this genus, and recently Berland (4) has recorded a specimen from New Caledonia. It is therefore of interest to record the occurrence of the genus *Migas* in Tasmania. The following description deals with a new species from this State. The name *Migas nitens* is suggested on account of the shiny appearance of the cephalothorax.

Migas nitens (*sp. nov.*).

Plate IV.

The description of the female is as follows:—

Measurements in millimetres (excluding the falces).

Total Length	10.0
Length of Cephalothorax	4.0
Breadth of Cephalothorax (across fovea)	3.7
Length of Abdomen	7.1
Breadth of Abdomen	5.4

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	1.6	3.4	3.0	2.1	10.1
2	1.4	3.0	2.8	1.8	9.0
3	1.2	2.8	2.6	2.3	8.9
4	1.6	3.9	4.3	3.0	12.8
				Tarsus	
Palpi	1.5	2.3	1.9	1.2	6.9

Cephalothorax: Shining, brown, hairless, moderately arched, slightly longer than broad.

Pars Cephalica: Gently ascending. A pair of conspicuous erect bristles stand one on each side of the centre line in front of the fovea. A row of three or four shorter bristles in single file extends from the ocular area about a third of the way along the middle line towards the fovea. The segmental groove is distinct, and near its posterior end on each side is a deep pit.

Ocular Area: Dark brown, more than twice as broad as it is long. Immediately behind each front median eye there is a long bristle curved forward over the eye, while rising from a point between these eyes is a single long erect bristle.

Clypeus: Wide, the front median eyes being removed from the margin by a distance equal to twice the diameter of one of these eyes. The surface is covered with fine transverse wrinkles, and there is a tuft of bristles before the front median eyes.

Pars Thoracica: Arched and sloping steeply down from the thoracic fovea to the posterior margin; devoid of hairs and bristles; radial grooves not well defined.

Thoracic Fovea: Deep, strongly recurved, and elevated so that its rim is not much lower than the highest point of the *pars cephalica*.

Marginal Band: Slightly reflexed, dark brown in colour. No distinct fringe is present, but a few isolated small hairs are visible.

Eyes: The eye space occupies more than half the width of the front of the cephalothorax. The eyes are in two rows. If viewed from above the front row appears straight, but viewed from in front it is seen to be procurved. The

rear row is recurved and shorter than the front row. The front median eyes are on a slight elevation. They are round and separated from each other by a distance equal to their individual diameter. The front laterals are poised obliquely and are the largest of the group. Each has a long diameter equal to slightly more than one and a half times the diameter of a front median eye, and the same distance separates its nearest point from its front median neighbour. The rear laterals are the smallest of the group, and each has a long diameter equal to about three-quarters that of a front median eye. The long diameter of a rear median eye is a little less than one and a half times the diameter of a front median eye. The rear median eyes are separated from each other by three and a half times the diameter of a front median eye, and each from the nearest point of its lateral neighbour by a little more than half the diameter of a front median eye. The distance separating the nearest points of the front and rear laterals of the one side is about equal to the diameter of a front median eye. The lateral eyes are on prominent black mounts, which make them appear larger and nearer to the other eyes than they actually are. (See Fig. 1.)

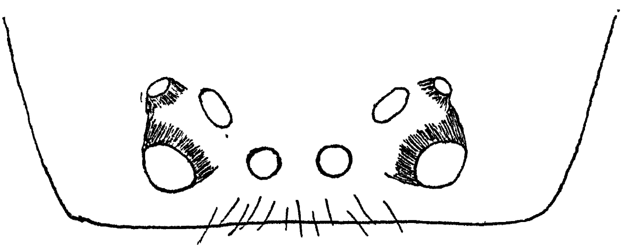


Fig. 1. *Migas nitens* (*sp. nov.*). Eyes in female.

Legs: Relative lengths, 4, 1, 2, 3; shining, concolorous with the cephalothorax, no scopula present. Femoral segments 1 and 2 are bowed. Tibial and metatarsal segments 1 and 2 armed with powerful curved spines on both the inner side and the outer side. On the outer side the spines are arranged in an irregular double row. (See Fig. 2.) The number and arrangement of the spines vary in different individuals of this species. Legs 3 and 4 are not very spiny, there being only one small spine on the outer side of the patella, and one on the outer side of the metatarsus of 3, and three small spines on the outer side of the metatarsus of 4. In the case of legs 1, 2, and 3, the superior tarsal claws

have a single tooth, while leg 4 has two teeth on the outer superior claw and none on the inner claw. All the inferior claws are small and bare.

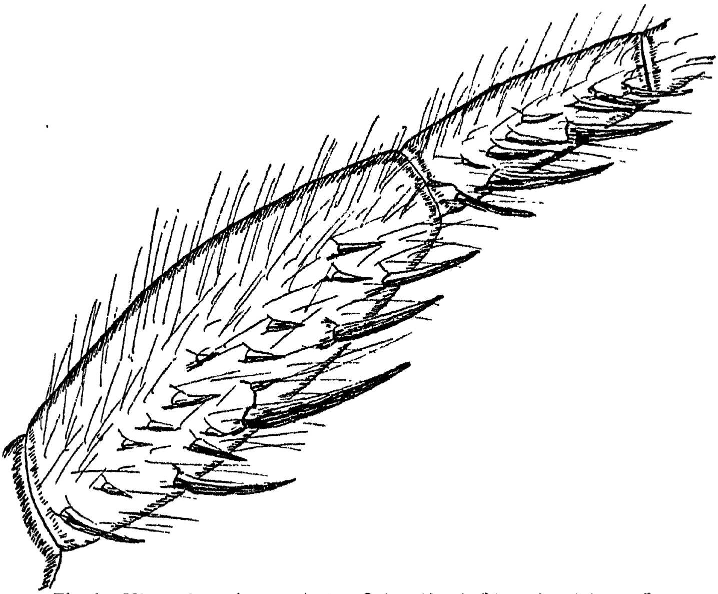


Fig. 2. *Migas nitens* (*sp. nov.*) ♀. Outer side of tibia and metatarsus I.

Palpi: Concolorous with the legs; femoral segment bowed. On the inner side of the patella there is a single large spine pointing downwards and inwards. (See Fig. 3.) The tibia usually has two short spines on the inner, and two on the outer side, while the tarsus is armed on both sides with powerful curved spines resembling those on legs 1 and 2. The single tarsal claw has one or two pectinations near the base.

Falces: Short, dark brown, shining; the horizontal surface is almost bare, the front surface clothed with bristles but without a rastellum. Fang well curved, strong, serrated, and reinforced with ridges as in *Heteromigas dovei* (Hogg). There are three large teeth on inner edge of furrow and six smaller teeth on the outer edge; no intermediate teeth are present.

Maxillæ: Light brown in colour; furnished with a beard of long reddish hairs along the inner margin, and with short spines extending over a somewhat central area from heel to apex.

Labium: A darker brown in colour than the maxillæ; arched, apex rounded, furnished with about 20 short spines and with long bristle-like hairs; separated from the sternum by a groove.

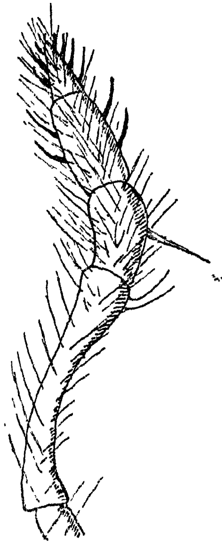


Fig. 3. *Migas nitens* (*sp. nov.*). Left palpus of female from above.

Sternum: Light brown, broadly pyriform, arched, thinly clothed with short black hairs.

Sigilla: Posterior pair are large and about as far from the margin as from the centre. Other sigilla are small, indistinct, and marginal.

Abdomen: Ovate; anterior portion overhangs the base of the cephalothorax; upper surface dark brown, thinly clothed with short hairs; under surface lighter in colour.

Spinnerets: Short, stout, yellowish, hairy. In the case of the superior pair the first joint is twice the length of the second, while the third joint is very small and dome shaped. Inferior pair are twice as long as broad, and separated by once their individual diameter.

Locality: Prince of Wales Bay, Derwent Park; and Cornelian Bay, New Town. 30th December, 1925.

Field Notes: At both the localities mentioned above the nest was made in an embankment near the shore. The burrow, which is only about 40 mm. deep, goes down at a

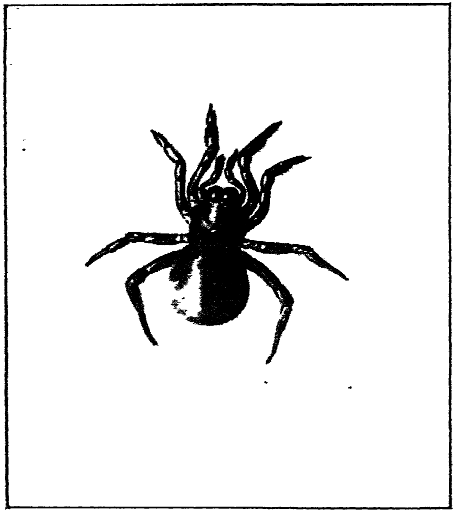


Fig. 1. *Migas nitens* (*sp. nov.*) ♀.

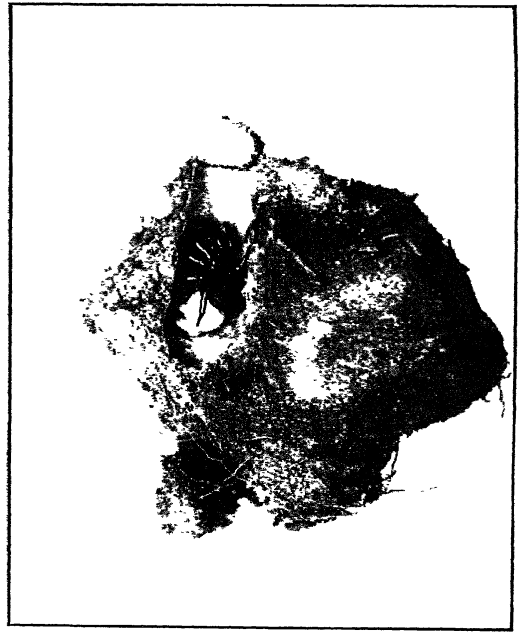


Fig. 2. *Migas nitens* (*sp. nov.*).
Vertical section through burrow showing spider guarding eggs.

slight incline from the vertical. It is lined throughout with a thick strong layer of silk, and closed with a neatly-fitting lid. Several burrows were found to be sealed up. On opening them the spider was discovered guarding her eggs. The latter, about ten in number, are not enclosed in a sac, but simply grouped together and fastened to the side of the burrow with a few strands of silk. They are placed near the bottom of the nest. (See Plate IV., Fig. 2.)

Sub-Family CTENIZINÆ.

Genus *Arbanitis*, L. Koch.

Arbanitis scaurus, *sp. nov.*

Plate V.

The description of the male is as follows:—

Measurements in millimetres (excluding the falces).

Total Length	14.0
Length of Cephalothorax	7.5
Breadth of Cephalothorax	6.5
Length of Abdomen	6.5
Breadth of Abdomen	5.0

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	3.5	8.0	8.0	10.0	29.5
2	3.0	8.0	8.0	9.0	28.0
3	2.5	6.5	6.0	8.0	23.0
4	3.0	8.5	9.5	11.0	32.0
				Tarsus	
Palpi	3.0	4.5	5.5	1.5	14.5

Cephalothorax: Obovate, dark brown, moderately clothed with long, yellowish, down-lying hair.

Pars Cephalica: Arched, gently ascending; segmental groove well marked; devoid of hair along the middle line, but provided with a row of black bristles.

Ocular Area: About one and a half times as broad as it is long, arched, raised, and with a group of eight or nine black bristles in front.

Clypeus: Narrow, hyaline, sloping forward.

Pars Thoracica: Arched, moderately broad, gently sloping to the rear; radial grooves well marked.

Thoracic Fovea: Deep and straight.

Marginal Band: Very narrow, fringed with coarse black bristles.

Eyes: In two rows; front row strongly procurved, rear row recurved. The front median eyes are round and somewhat raised. They are separated from each other by a space equal to slightly less than one-third of their own individual diameter, and from the front laterals by about twice this distance. Both the front and the rear laterals are elliptical and poised obliquely. The rear laterals are slightly smaller than the front laterals, which have a long diameter equal to about one and a third times the diameter of a front median eye. The distance which separates the lateral eyes of the same side is equal to that which separates the front laterals from the front medians. The long diameter of the rear medians is slightly less than the diameter of the front medians. They are close to the rear laterals, but do not actually touch them. (See Fig. 4.)

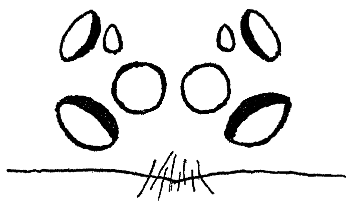


Fig. 4. *Arbanitis scaurus* (*sp. nov.*). Eyes in male.

Legs: Relative lengths, 4, 1, 2, 3. Concolorous with the cephalothorax, clothed with light brown hairs and coarse black bristles. Tarsi I. and II. are devoid of spines, but possess a scopula which extends half way along the metatarsus. All the metatarsi and tibiæ are bespined. Metatarsus I. is slightly bowed. Tibia I. is armed with two apophyses near the apex. The upper one is broadly bifurcated, one prong consisting of three short blunt teeth close together, while the other prong consists of a single sharp tooth bent at right angles. Between the two prongs there is a short spine. The lower apophysis is longer than the upper one and ends in a row of four blunt teeth curved inwards. (See Fig. 5.) On the upper side of each leg, particularly on the tibia, metatarsus, and tarsus, between the bristles, there is an irregular row of small tubercles. In the top of each tubercle there is a cup-like depression from the centre of which rises a thread-like hair, longer and finer than any of the other hairs on the legs. It was noticed that in a freshly killed spider these fine hairs were swayed by the slightest movement of the air, whereas the other hairs remained motionless.

The superior tarsal claws have seven teeth, five teeth being close together near the base of the claw, and two teeth on the side of the claw towards the apex. Inferior claw is bare.

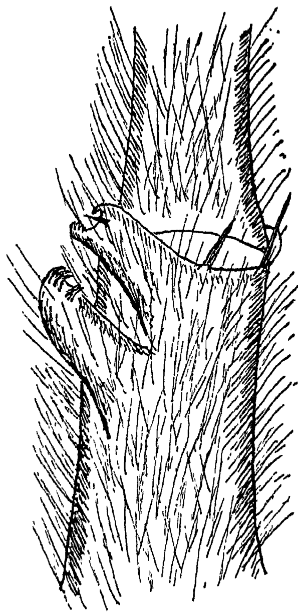


Fig. 5. *Arbanitis scaurus* (*sp. nov.*). Apex of tib.a I. of male from below.

Palpi: About half the length of leg I., hairy, concolorous with the legs; tibial segment very much inflated and furnished with an apophysis thickly covered with spines. Bulb pyriform, bilobed, shining, produced into a very short, flat, and twisted style. (See Fig. 6.) The tarsal segment is small.

Falces: Small, black, clothed with black bristles; furnished with a well formed rastellum. The fang is curved, shining, and dark reddish brown in colour. The inner margin of falx sheath is armed with teeth, the outer margin thickly fringed with long yellow hair.

Maxillæ: Dark brown, inner edge fringed with yellow hair. There is a small cluster of spines at the lower inner corner.

Labium: Submerged; slightly longer than broad, a few black bristles at the apex, but no spines are present.

Sternum: Pyriform, dark brown, clothed with short bristles.

Sigilla: Posterior pair not large and placed near the margin. The others are indistinct.

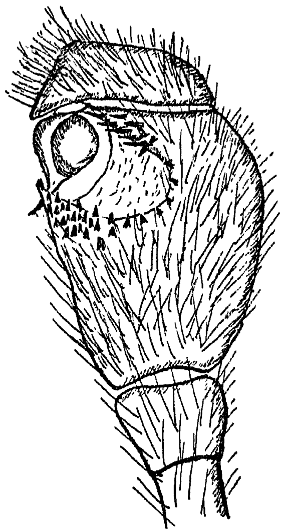


Fig. 6. *Arbanitis scaurus* (*sp. nov.*). Palpus of male.

Abdomen: Dark brown, clothed with long black slender setæ and short yellowish hairs on the upper surface. The lower surface is similarly clothed, but the setæ are short. On the upper surface is an indistinct pattern resembling that on the female (see below).

Spinnerets: Short, yellowish-brown, hairy. The first joint of the superior pair is the longest and equal in length to the other two combined. Inferior pair very small, cylindrical, and separated from each other by a space equal to once their individual diameter.

The description of the female is as follows:—

Measurements in millimetres (excluding the falces).

Total Length	21.0
Length of Cephalothorax	10.0
Breadth of Cephalothorax	7.5
Length of Abdomen	11.0
Breadth of Abdomen	7.5

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	4.5	9.0	8.0	6.5	28.0
2	4.0	7.5	7.0	6.0	24.5
3	3.5	6.0	6.0	5.0	20.5
4	4.0	8.0	10.0	8.0	30.0
				Tarsus	
Palpi	4.0	6.5	6.0	3.5	20.0

Cephalothorax: Obovate, dark brown, moderately clothed with long yellowish down-lying hair as in the male.

Pars Cephalica: Arched, gently ascending, segmental groove distinct. Along the middle line from eye space to fovea there is a row of black bristles standing out from a band of yellow hair, on each side of which there is a bare strip.

Ocular Area: One and two-third times as broad as it is long, raised, arched, and provided with a few short bristles in front.

Clypeus: Wide, hyaline, sloping forward, transversely wrinkled.

Pars Thoracica: Arched, moderately broad, sloping to the rear, radial grooves distinct.

Thoracic Fovea: Large, deep, and straight.

Marginal Band: Wide, hyaline, undulating, fringed with black bristles.

Eyes: In two rows. Front row strongly procurved, rear row recurved. The round front median eyes are somewhat raised. They are separated from each other by a space equal to a little more than two-thirds of their individual diameter, and from their lateral neighbours by a space nearly equal to their individual diameter. The front and rear laterals are elliptical, poised obliquely, and separated from each other by a space equal to the long diameter of a rear lateral. The front laterals are the largest of the group, their long diameter being equal to twice the space separating the front median eyes. The rear medians are the smallest of the group, being slightly smaller than the front medians. They are separated by a space equal to three times that which separates the front median eyes. They are close to but do not touch their lateral neighbours. (See Fig. 7.)

Legs: Relative lengths, 4, 1, 2, 3; light brown in colour. Tarsus I. and three-quarters of metatarsus I. thickly scopulated. Tarsus II. and half metatarsus II. also thickly scopulated. The other tarsal and metatarsal segments not scopulated. Tarsus I. is devoid of spines, tarsus II. has two small

spines on the outer side. The other tarsi and all metatarsi and tibiæ are well armed with spines. Patella III. has three short spines on the outer side. All other segments are

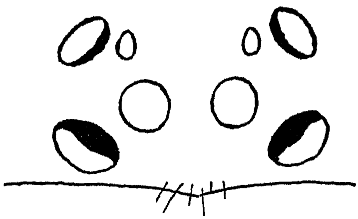


Fig. 7. *Arbanitis scaurus* (*sp. nov.*). Eyes in female.

devoid of spines. The legs are lightly clothed with coarse black bristles and a little hair similar to that on the cephalothorax. The fine thread-like hairs noticed in the male are also present in the female. The superior tarsal claws have four teeth, a large tooth and a minute tooth being near the base of the claw, and two teeth on the side of the claw towards the apex. The inferior claw is bare.

Palpi: Long, being almost equal in length to the third pair of legs. Similar in colour and clothing to the legs. Tarsus is thickly scopulated. The single tarsal claw has a minute tooth near the base, and close to it a large tooth separated by a space from two medium-sized teeth.

Falces: Black, strong, clothed with black bristles in front and provided with a rastellum. The fang is well curved, long, shining, and black. Inner edge of falx sheath armed with a row of eight large teeth, outer edge provided with a thick fringe of long yellowish hair. There is an intermediate row of six minute teeth near the base. The number and arrangement of the teeth vary in different individuals.

Maxillæ: Dark brown, hairy, inner edge fringed with long reddish brown hair. A few small spines are placed at the lower inner angle.

Labium: Submerged, hairy, rounded in front, devoid of spines.

Sternum: Pyriform, dark brown, clothed with black bristles, curved in front round the base of the labium.

Sigilla: Posterior pair are not very large. They are placed near the margin. The others are indistinct.

Abdomen: Obovate, yellowish brown underneath, dark brown above. Clothed with short hairs interspersed with

isolated long hairs. On the sides are a few scattered dark brown spots; from the centre of each spot projects a long hair. On the upper surface a faint pattern is visible (more distinct in alcohol). It consists of a light brown central spot near the anterior end, with a smaller spot on each side. Behind these are ten faint bars arranged five on each side.

Spinnerets: Short, yellowish brown, hairy. First joint of the superior pair slightly longer than the second and third joints combined. The second joint is twice the length of the third joint, which has a rounded tip. The inferior pair are very small and separated by a space equal to once their individual diameter.

Locality: Westmoreland Falls, Mole Creek. 5th April, 1926.

Observations: Rainbow and Pulleine (5) have given a table in elucidation of the known Australian species of the genus *Arbanitis* (L. Koch). The table includes one Tasmanian form, namely *Arbanitis maculipes* (Hogg) (6), and eleven other species.

Field Notes: The male of *Arbanitis scaurus* was found under a log. The female makes a burrow in the ground, in rotten logs, or in fern stumps. The burrow is lined with silk and is not provided with a lid.

Sub-Family DIPLURINÆ.

Genus *Atrax* (O. P. Cambr.)

Atrax venenatus, *sp. nov.*

Plate VI.

The description of the male is as follows:—

Measurements in millimetres (excluding falces).

Total Length	16.0
Length of Cephalothorax	8.0
Breadth of Cephalothorax	6.5
Length of Abdomen	9.0
Breadth of Abdomen	6.5

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	3.6	7.0	7.0	7.0	24.6
2	2.9	6.5	6.5	6.5	22.4
3	2.5	5.9	5.5	6.9	20.8
4	3.0	6.7	6.7	8.0	24.4
				Tarsus	
Palpi	3.2	4.0	4.0	1.3	12.5

Cephalothorax: Very dark chocolate brown in colour, arched, shiny, longer than broad.

Pars Cephalica: Moderately high, sloping gently to the thoracic fovea, lightly clothed with a few scattered black hairs. A median row of bristles extends from the eye space to the fovea, and on each side of this is a shorter parallel row. Segmental groove is distinct.

Ocular Area: Black, raised, twice as broad as long.

Clypeus: Moderately wide, transversely wrinkled, hyaline, furnished with a tuft of short bristles below the front median eyes.

Pars Thoracica: Arched, sloping gently to the rear; radial grooves deep and well defined.

Thoracic Fovea: Deep and strongly procurved.

Marginal Band: Broad, reflexed, brown, fringed with a few isolated hairs.

Eyes: Arranged in two rows. The front row is procurved and the rear row is recurved. The front median eyes are the smallest of the group, and are separated by a space equal to one and one-third times their individual diameter. The long diameter of a front lateral eye is equal to twice the diameter of a front median eye. A space equal to half the diameter of a front median eye separates each front lateral from its median neighbour. Each rear median eye has a long diameter slightly greater than the diameter of a front median eye. The long diameter of a rear lateral is equal to one and one-third times the diameter of a front median eye. The rear median eyes are separated from each other by a space slightly more than three times the diameter of a front median eye. A space equal to the long diameter of a rear median eye separates the front and rear laterals. (See Fig. 8.)

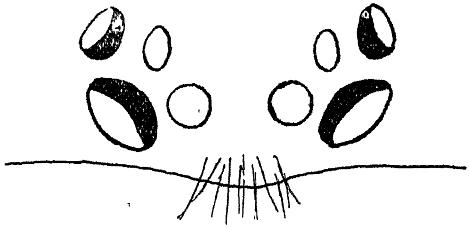


Fig. 8. *Atrax venenatus* (*sp. nov.*). Eyes in male.

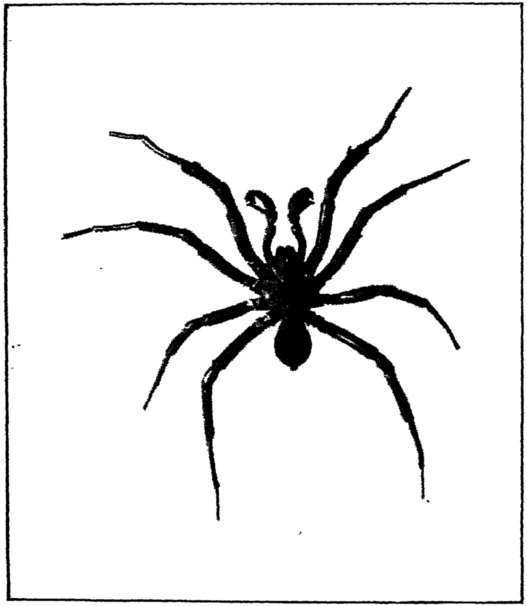


Fig. 3. *Arbanitis scaurus* (*sp. nov.*) ♂.

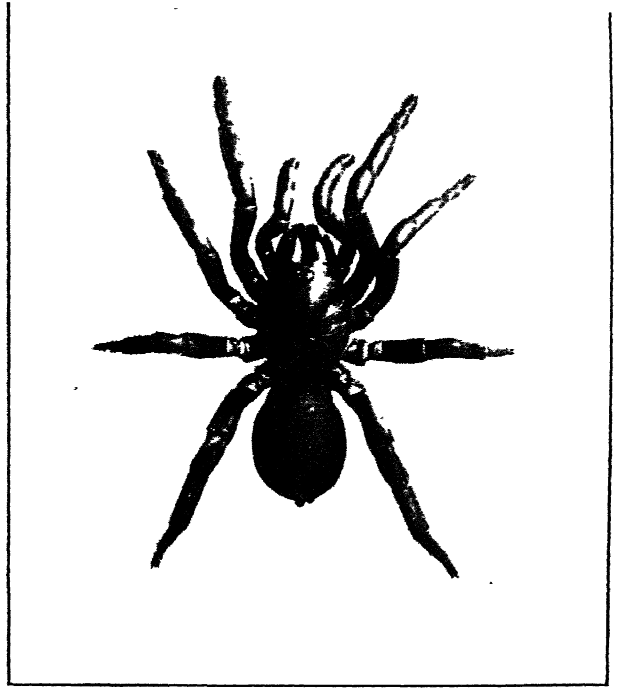


Fig. 4. *Arbanitis scaurus* (*sp. nov.*) ♀.

Legs: Relative lengths, 1, 4, 2, 3; concolorous with the cephalothorax, tapering, moderately strong. No true scopula is present. All the tarsal, metatarsal, and tibial segments are armed with spines. In the case of tibia I. the whole length of the under surface is heavily spined, likewise the basal half of the under surface of tibia II. (See Fig. 9.)

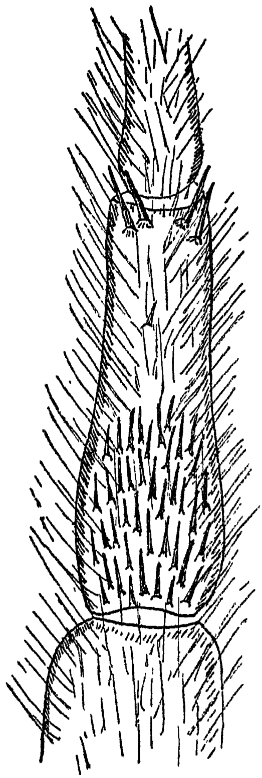


Fig. 9. *Atrax venenatus* (*sp. nov.*). Tibia II. of male from underneath.

One or two spines are present on femoral segments I. and II., also on patellæ I. and II. The superior tarsal claws are provided with a row of about 13 teeth running diagonally across the claw. The inferior claw is small and bare.

Palpi: Concolorous with the legs, rather short and hairy. The femoral segment is bowed and possesses one or two spines at the apex on the upper side. Patella is also armed

with one or two curved spines. The tibia is furnished with about nine spines, five of which are near the apex. The tarsus is deeply cleft. The genital bulb is pyriform, and is produced into a long, thin, somewhat flattened style, which is slightly twisted and ends in a spatulate point. (See Fig. 10.)

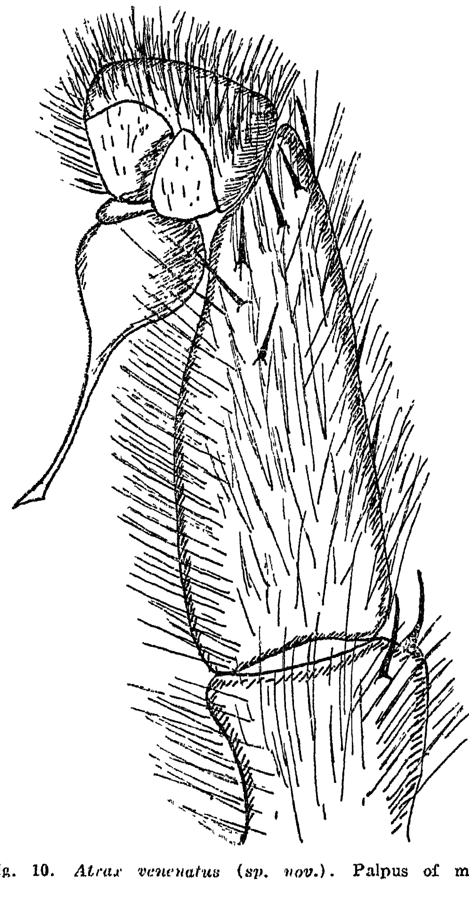


Fig. 10. *Atrax venenatus* (*sp. nov.*). Palpus of male.

Maxillæ: Brown, hairy, most of the surface covered with small spines, inner fore angle ends in an obtuse point.

Labium: Free, concolorous with the maxillæ, arched, as broad as long, densely covered with small spines, provided in front with long hairs and bristles.

Sternum: Shield-shaped, slightly darker in colour than the maxillæ, clothed with black bristles.

Sigilla: Large and distinct. The anterior pair marginal, the other two pairs removed from the margin.

Abdomen: Ovate, brownish black in colour, clothed with long black bristles and short black hairs. The anterior portion slightly overhangs the base of the cephalothorax.

Spinnerets: Brownish yellow, short and hairy. The superior pair tapering, first and third segments equal in length and twice as long as the second segment. Inferior spinners small, cylindrical, and about once their individual transverse diameter apart. Anal tubercle is conspicuous.

The description of the female is as follows:—

Measurements in millimetres (excluding the falces).

Total Length	18.0
Length of Cephalothorax	7.5
Breadth of Cephalothorax	6.5
Length of Abdomen	11.5
Breadth of Abdomen	9.5

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	3.0	6.0	6.0	6.0	21.0
2	2.7	5.5	5.5	4.5	18.2
3	2.5	4.5	4.5	4.5	16.0
4	2.5	6.0	5.0	6.0	19.5
				Tarsus	
Palpi	3.0	4.5	3.0	3.0	13.5

Cephalothorax: Very dark brown, almost black in colour, shining, slightly longer than broad, clothed with a few black hairs scattered over the surface.

Pars Cephalica: Raised, arched, sloping towards the thoracic fovea; furnished with a median row of long thin erect bristles extending from the eye space to the fovea, and on each side of this median row there is a shorter parallel row, as in the male.

Ocular Area: Twice as broad as long, slightly raised, and gently arched. A group of bristles, which slope forward, occupies the space between the rear median eyes.

Clypeus: Narrow, of a vitreous greyish tint, furnished with a tuft of black bristles below the eyes; one long bristle stands out conspicuously from a point in front of and between the front median eyes.

Pars Thoracica: Broad, indented on its rear margin, radial grooves distinct and deep.

Thoracic Fovea: Deep and strongly procurved.

Marginal Band: Narrow, slightly reflexed, yellowish brown, lightly fringed with fine hairs.

Eyes: Front row slightly procurved, rear row recurved. The round front median eyes are the smallest of the group. They are separated by a space equal to nine-eighths of their individual diameter. The elliptical front laterals are poised obliquely. They are the largest of the group. Each has a long diameter almost twice the diameter of a front median eye, and each is separated from its median neighbour by a space equal to the diameter of the latter and from the corresponding rear lateral by three-quarters of that distance. The long diameter of each rear median is equal to nine-eighths of the diameter of a front median eye. The distance between the rear median eyes is equal to three and a half times that between the front median eyes. Each rear median eye is separated by a space equal to one-third of its own long diameter from its lateral neighbour. The long diameter of a rear lateral is slightly greater than that of a rear median eye. (See Fig. 11.)

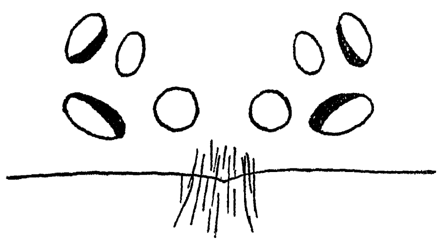


Fig. 11. *Atrax venenatus* (*sp nov.*). Eyes in female.

Legs: Very dark brown, moderately strong, tapering, clothed with long black bristles and hairs. Relative lengths, 1, 4, 2, 3. All the tarsi and metatarsi are bespined. Tibiæ I., II., and IV. have each a single spine on the under side near the distal end. Tibia III. has five spines on the outer side, two on the inner. There are four spines on the outer side of patella III., near the apex. The femoral segments are devoid of spines. Superior tarsal claws have a row of eight pectinations running diagonally across the claw. The inferior claw has two minute teeth near its base.

Palpi: Short, concolorous with legs, clothed with black bristles and hairs. Tarsal segment has five spines on the

inner side, and three on the outer side. Tibia has two spines on the under side near the apex. The other segments are devoid of spines. No true scopula is present. The single tarsal claw has a diagonal row of eight pectinations.

Falces: Concolorous with cephalothorax, strong, clothed with black bristles and hairs. There is no rastellum. Fang is well curved and reddish brown in colour. Outer margin of falx sheath furnished with a row of ten teeth, inner margin with nine, while there is also an intermediate row of thirteen running the whole length of the furrow.

Maxillæ: Brown, arched, divergent, hairy, the inner apical angle ends in an obtuse point. The full length of the inner surface is studded with small spines, which are especially numerous at the base.

Labium: Truncate in front, as broad as long, thickly studded with small spines and clothed with long brown hairs.

Sternum: Shield shaped, brown, clothed with black bristles, excavated in front round the base of the labium.

Sigilla: Large and distinct, the anterior pair marginal, the others removed from the margin.

Abdomen: Ovate, brownish black, clothed with long black bristles and short black hairs. The base of the abdomen slightly overhangs the cephalothorax. In alcohol a faint pattern is seen. This takes the form of three very fine diagonal stripes on each side.

Spinnerets: Short, clothed with yellowish brown hairs. The superior pair have the first joint the longest, the second joint the shortest, while the third joint is slightly shorter than the first joint. The inferior pair are short, cylindrical, with rounded apices and separated from each other by a space equal to once their individual diameter.

Locality: New Town Creek, Hobart. 22nd December, 1925.

Field Notes: This spider is widely distributed in Tasmania. In the south I have taken specimens at the Cascades, at Lenah Valley, across the Derwent at East Risdon, and at New Town; while in the north I have found it at Trevallyn. Mr. A. L. Meston, M.A., was good enough to give me a male specimen, which he took on Ben Lomond, at an altitude of 4,300 feet. The spider is generally found in shady situations, where it constructs a silken tube under stones, among fallen leaves, twigs, or moss. The tube is frequently branched, and at the opening it is sometimes expanded into a network

of threads. Like other members of the genus *Atrax*, the female is of a pugnacious disposition, and strikes viciously when a collecting tube is brought near, while glistening drops of a clear liquid exude from the pore at the tip of the fang. This habit suggested the specific name *venenatus*. Adult specimens show considerable variations in size, some being larger and some smaller than the type specimen described above.

Atrax pulvinator, *sp. nov.*

Plate VII.

The description of the female is as follows:—

Measurements in millimetres (excluding the falces).

Total Length	17.0
Length of Cephalothorax	7.0
Breadth of Cephalothorax	6.0
Length of Abdomen	11.0
Breadth of Abdomen	9.0

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	3.0	5.5	4.5	3.7	16.7
2	2.5	4.5	4.0	3.3	14.3
3	2.5	4.5	3.5	3.0	13.5
4	2.8	5.5	5.0	4.5	17.8
				Tarsus	
Palpi	3.0	4.0	3.0	2.0	12.0

Cephalothorax: Brown, shining, slightly longer than broad.

Pars Cephalica: Arched, well elevated, and sloping steeply to the thoracic fovea; smooth except for a few isolated hairs and a median row of fine bristles running from the eye space to the fovea. Segmental groove well defined.

Ocular Area: Two and a half times as broad as it is long, slightly raised, furnished in front with a tuft of stiff bristles. A long conspicuous bristle stands between the front median eyes and a few shorter ones behind the eye space.

Clypeus: Hyaline, transversely wrinkled, indented at the middle, moderately broad.

Pars Thoracica: Broad, somewhat depressed, indented at its rear margin, radial grooves distinct.

Thoracic Fovea: Deep and strongly procurved.

Marginal Band: Broad, slightly reflexed, fringed with a few long hairs.

Eyes: In two rows; rear row recurved and a little longer than the front row, which is slightly procurved. The round front median eyes are on a slight elevation, and separated from each other by one and a quarter times their individual diameter. The front laterals are the largest of the group, and have a long diameter equal to one and two-thirds the diameter of a front median eye. They are poised obliquely, and each is separated from its front median neighbour by a space equal to half its own long diameter and from its rear lateral neighbour by slightly more than this space. The long diameter of a rear lateral eye is equal to the diameter of a front median eye. The rear median eyes are separated from each other by a space equal to two and two-thirds that which separates the front medians from each other. (See Fig. 12.)

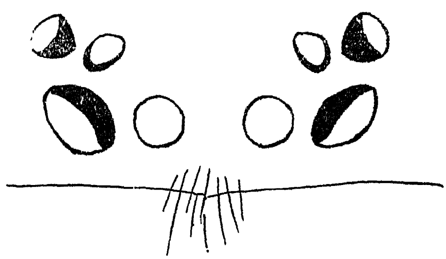


Fig. 12. *Atrax pulvinator* (*sp. nov.*). Eyes in female.

Legs: Relative lengths, 4, 1, 2, 3. Concolorous with cephalothorax, clothed with long black bristles and brown hairs. No scopula is present on any of the legs. All the tarsi and metatarsi are lightly armed with spines. Tibiæ I. and II. possess no spines, but III. and IV. are lightly bespined. On the outer side of patella III. there is a group of ten short spines and one or two on the outer side of patella IV. The superior tarsal claws of legs I. and II. have five teeth in a diagonal row across the claw, and the inferior claw has two teeth. While for legs III. and IV. the superior tarsal claws have one large tooth and three minute teeth, and the inferior claw is bare. Considerable variations in the pectination of the tarsal claws were found to exist in different individuals.

Palpi: Brown, moderately long, the tarsal segment is armed with four spines. The single claw has three teeth close together near the base.

Falces: Large, strong, dark-brown, clothed with stiff bristles. There is no rastellum. Fang is well curved. Inner margin of falx sheath armed with five teeth, outer margin with six. Three small intermediate teeth are also present near the base.

Maxillæ: Light brown, arched, heel rounded; the whole length of the inner area is lightly covered with spines, and coarse hairs. The inner edge is fringed with light brown hairs.

Labium: Light brown, arched, as broad as long, truncated in front and furnished with numerous short spines and long hairs.

Sternum: Brownish yellow, broad, somewhat shield-shaped, clothed with bristle-like hairs. In front it is curved round the base of the labium and terminates on each side in a point.

Sigilla: First and second pairs are sub-marginal, the third pair are large and placed midway between the margin and the centre line.

Abdomen: Obovate, dark brown, hairy.

Spinnerets: Yellowish brown, hairy. The superior pair are tapering, and about one quarter the length of the cephalothorax; the second and third joints are equal in length, the first joint is the longest, being equal in length to the other two combined. The inferior pair are small, cylindrical, with rounded apices and separated by about once their individual transverse diameter. Anal tubercle prominent.

Locality: Cascades, Hobart. 25th December, 1925.

Field Notes: The burrow of this spider was found in soft soil near the bank of a creek. It was about 180 mm. deep and 15 mm. in diameter, and went down almost vertically. It was lined inside with a fairly strong silken tube. This was not attached very firmly to the side of the burrow, and was easily removed. At the surface the silken tube ran along the ground for about 50 mm. underneath a bed of moss. When found the silken tube was closed up, but there was no sign of any lid. Two burrows were found; one contained a beautiful pillow-shaped egg sac, 25 mm. long and 15 mm. broad. This was attached by its four corners to the side of the silk tube just below the surface. (See Plate VII., Fig. 8.)

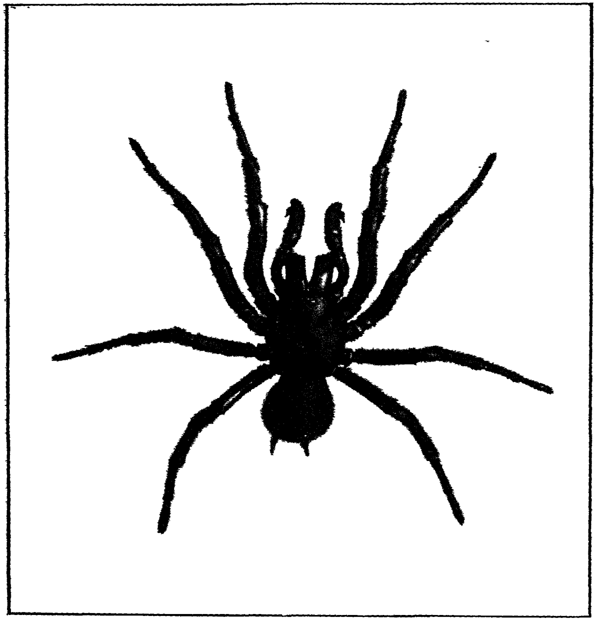


Fig. 5. *Atrax venenatus* (*sp. nov.*) ♂.

Fig. 6. *Atrax venenatus* (*sp. nov.*) ♀.

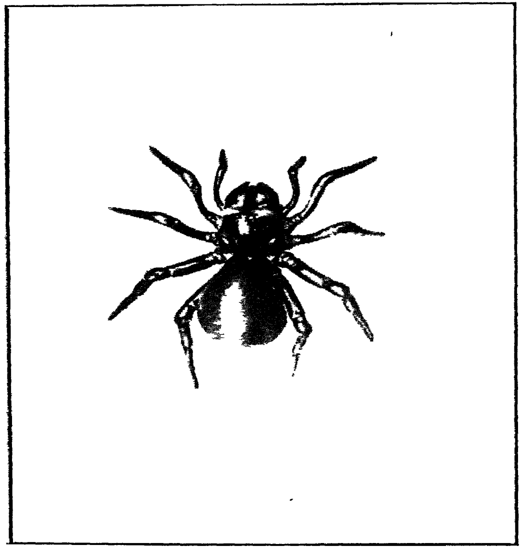


Fig. 7. *Atrax pulvinator* (*sp. nov.*) ♀.

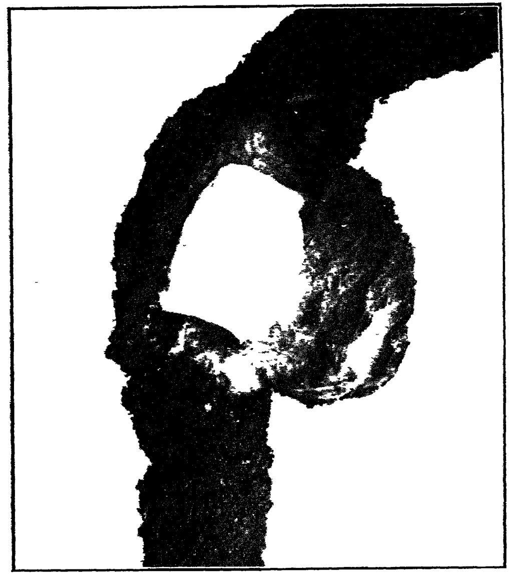


Fig. 8. *Atrax pulvinator* (*sp. nov.*).
Silk tube removed from burrow and side cut open to show egg sac.

Genus *Hexathele* (Ausserer).

Hexathele montanus, sp. nov.

Plates VIII. and IX.

The description of the male is as follows:—

Measurements in millimetres (excluding the falces).

Total Length	16.5
Length of Cephalothorax	8.5
Breadth of Cephalothorax	7.5
Length of Abdomen	8.5
Breadth of Abdomen	6.0

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	4.0	8.5	9.0	11.0	32.5
2	3.5	8.0	9.0	11.5	32.0
3	3.3	7.0	8.5	12.0	30.8
4	3.3	9.0	10.0	14.0	36.3
				Tarsus	
Palpi	3.0	5.0	5.0	1.0	14.0

Cephalothorax: Black, slightly arched, nearly as broad as it is long; almost devoid of hairs.

Pars Cephalica: Not very high, sloping gently to the thoracic fovea. Segmental groove distinct.

Ocular Area: A little more than twice as broad as it is long, slightly arched.

Clypeus: Narrow, black, and provided with a tuft of a few short bristles in front of the median eyes.

Pars Thoracica: Broad, radial grooves well marked, rear margin slightly indented.

Thoracic Fovea: Small, deep, and straight.

Marginal Band: Narrow, fringed with long black bristles.

Eyes: In two rows. Viewed from above the front row is straight, and the rear row recurved. The round front median eyes are separated from each other by a space equal to one-third of their individual diameter, and from their lateral neighbours by the same distance. The front and rear laterals are poised obliquely and separated by a space equal to that which separates the front median eyes. The front laterals are the largest of the group and have a long diameter equal to one and a sixth times that of a front median eye. The long diameter of the rear laterals is equal to the diameter of a front median eye, while that of a rear median eye is

three-quarters of that length. The space separating the rear medians is equal to one and three-quarter times the diameter of a front median eye. (See Fig. 13.)

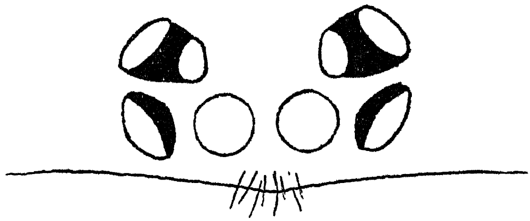


Fig. 13. *Hexathele montanus* (*sp. nov.*). Eyes in male.

Legs: Relative lengths, 4, 1, 2, 3. Long, slender, and tapering; nearly black in colour, except the patellæ, which are brown. The tarsal segment of each leg has a divided scopula, which is not very dense. The division is occupied by a row of short setæ. The legs are well armed with spines on all the segments, except the coxæ, trochanters, and the under side of the femurs. Metatarsus I. is slightly thickened in the centre. Tibia I. is provided with a prominent curved spine rising from a small apophysis on the under side at the apex. (See Fig. 14.) The superior tarsal claws

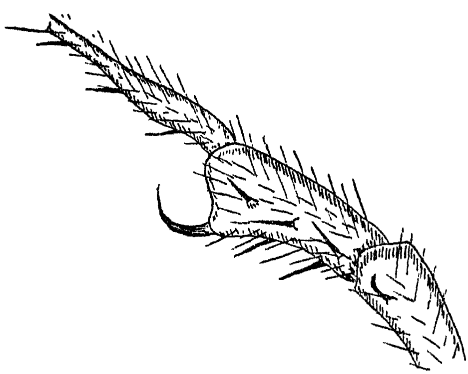


Fig. 14. *Hexathele montanus* (*sp. nov.*). Tibia I. of male.

have a diagonal row of eleven pectinations and the inferior claw has two pectinations.

Palpi: Concolorous with legs, clothed with long black bristles, but devoid of spines, except for a few on the upper

side of the femoral segment. The bulb is pyriform and is produced into a finely pointed style. The tibial segment is somewhat inflated in its basal half. (See Fig. 15.)

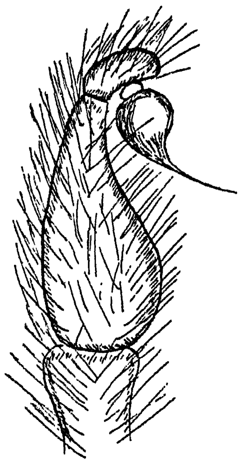


Fig. 15. *Hexathele montanus* (*sp. nov.*). Palpus of male.

Falces: Black, shining, clothed with bristles but without a rastellum. Inner edge of falx sheath armed with a row of about thirteen teeth; the outer edge provided with a fringe of reddish brown hair. Fang black, moderately long, and curved.

Maxillæ: Dark brown, with a reddish brown beard along the inner edge. The inner fore corner terminates in a blunt prominence The heel is well rounded and furnished with spines.

Labium: Slightly longer than broad; dark brown at the apex, black near the base; sides nearly parallel, concave from apex to base, convex from side to side, apex rounded and furnished with a few small spines and long black bristles. Several well marked creases across the base.

Sternum: Black, ovate, broadest between the second pair of coxæ, excavated in front round the base of the labium, clothed with black bristles and hairs.

Sigilla: Moderately large, about equal in size, and placed near the margin.

Abdomen: Obovate, black, with five pairs of faint yellow spots on the dorsal surface. (These spots are more distinct

in young specimens.) Clothed with long black bristles, each rising from a small tubercle. Lung covers yellowish. The front of the abdomen slightly overhangs the base of the cephalothorax.

Spinnerets: Six in number, dark brown in colour. The superior pair are 5 mm. long, and tapering. The third joint is the longest, being twice the length of the second joint and slightly longer than the first joint, which is divided at the rear, and has the appearance of being built up of two segments, but the dividing line is not continued right round the joint. The second pair are short, cylindrical, and rounded at the tip, equal in length to the second joint of the superior pair, and separated from each other by three times their own individual diameter. The third pair are about equal in length to the second pair, short, cylindrical, and concave at the tip. The concavity contains a sunken dome. They are situated outside the second pair, but close to them and a little nearer the front. Anal tubercle prominent.

The description of the female is as follows:—

Measurements in millimetres (excluding the falces).

Total Length	20.0
Length of Cephalothorax	10.0
Breadth of Cephalothorax	8.5
Length of Abdomen	11.0
Breadth of Abdomen	8.5

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	4.5	8.5	9.25	9.5	31.75
2	4.0	8.0	8.50	8.0	28.50
3	3.5	7.0	8.00	8.5	27.00
4	4.0	9.0	9.50	11.0	33.50
				Tarsus	
Palpi	4.0	6.5	6.50	4.0	21.00

Cephalothorax: Black, moderately arched, longer than broad, almost hairless.

Pars Cephalica: Moderately high, much more elevated than in the male; segmental groove distinct. There is a row of four or five black bristles in a central line behind the eyes.

Ocular Area· About two and a third times as broad as it is long. Slightly arched.

Clypeus: Dark coloured, narrow, furnished with a few short bristles in front of median eyes.

Pars Thoracica: Broad, radial grooves distinct, indented on rear margin.

Thoracic Fovea: Small, deep, and straight.

Marginal Band: Narrow and lightly fringed with black bristles.

Eyes: In two rows. When viewed from above the front row is straight and the rear row recurved. The round front median eyes are separated from each other by a space equal to about two-thirds of their individual diameter and from their lateral neighbours by the same distance. The front and rear laterals are equal in size and have a long diameter about one and a third times the diameter of a front median eye. They are poised obliquely and separated by a distance equal to one-third of their long diameter. The rear median eyes are slightly larger in long diameter than the front median eyes; they are separated from each other by a space equal to four times that which separates the front median eyes and from the rear laterals by a space equal to slightly less than half that between the front median eyes. (See Fig. 16.)

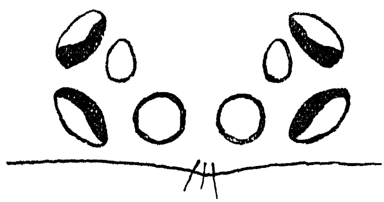


Fig. 16. *Hexathele montanus (sp. nov.)*. Eyes in female.

Legs: Relative lengths, 4, 1, 2, 3. Black, moderately long and tapering. The tarsi are all without a scopula. All the segments of the legs are bespined, except the coxæ, trochanters, and the under side of the femurs. The superior tarsal claws are armed with a diagonal row of about eleven pectinations. The inferior claw has two pectinations. The legs are clothed with black hairs and bristles.

Palpi: Concolorous with the legs and similarly armed and clothed. The single tarsal claw has about nine pectinations.

Falces: Black, large, and strong; clothed with bristles but without a rastellum. Fang well curved and long. Inner margin of falx sheath has a row of eleven teeth. The outer margin is thickly fringed with hair.

Maxillæ: Dark brown with a thick fringe of reddish brown hairs along the inner margin. The inner fore corner is produced into a well marked prominence, but not to the same extent as in the male. Inner surface concave. Heel is rounded and furnished with a group of spines.

Labium: Slightly longer than broad, truncated in front, clothed with bristles and short spines, separated from the sternum by a well marked groove.

Sternum: Black, ovate, clothed with black bristles and hairs, excavated in front round the labium.

Sigilla: Moderately large, about equal in size and situated near the margin.

Abdomen: Obovate, black, clothed with long black bristles and faintly marked with five pairs of yellowish spots as in the male. Anterior portion overhangs the base of the cephalothorax. Lung covers yellow.

Spinnerets: Six in number. The superior pair 5.6 mm. long, tapering; the third joint is the longest, being slightly more than twice the length of the second joint, and one and a half times the length of the first joint, which is divided at the rear as in the male. The second pair of spinnerets are short, cylindrical, and equal in length to the second joint of the superior pair. They are separated by about four times their individual diameter. The third pair are slightly longer than the second pair, cylindrical, and end in a concave tip in which there is a sunken dome. They are situated outside the second pair, but close to them, and a little more to the front. Anal tubercle prominent. (See Plate IX., Fig. 11.)

Locality: Higgs' Track, Western Tiers, Chudleigh. 2nd April, 1926.

Observations: The genus *Hexathele* has not been recorded from Australia previously. It is a typical New Zealand genus (7).

Field Notes: Both the male and the female were found in burrows in a moss-covered, rotten log. One or two immature specimens were taken under stones. The burrows in the log seemed to have been made in cracks and crevices, which already existed. These the spider had lined with a thin layer of white silk. The opening to the burrow was not provided with a lid. The specimens were taken at an altitude of about 2,500 feet.

Family THERIDIIDÆ.

Genus *Ariamnes*, Thor.

Ariamnes patersoniensis, sp. nov.

Plate X.

The description of a single female specimen is as follows:—

Measurements in millimetres.

Total Length	16.7
Length of Cephalothorax	2.2
Breadth of Cephalothorax	1.0
Length of Abdomen	14.5
Breadth of Abdomen	0.9

Leg	Coxa	Tro-chanter	Femur	Patella	Tibia	Meta-tarsus	Tarsus	Total
1	0.4	0.4	5.9	0.6	2.1	5.2	1.4	16.0
2	0.4	0.2	3.2	0.5	2.0	2.1	1.1	9.4
3	0.2	0.2	1.8	0.4	0.9	1.0	0.8	5.3
4	0.3	0.3	5.3	0.6	3.6	4.3	1.7	16.1

Cephalothorax: Yellowish brown, arched, more than twice as long as broad, very narrow in front, broadest above the coxæ of legs II., and does not become appreciably narrower towards the rear, clothed with a few short isolated hairs.

Pars Cephalica: Raised, narrow, and only two-fifths of the total length of the cephalothorax. The segmental groove is distinct.

Ocular Area: Broader than long; the four median eyes occupy the corners of a raised area which is almost square in outline.

Clypeus: Yellow, deep, the distance from the front median eyes to the edge of the clypeus is equal to twice the space which separates the front median eyes. A few scattered hairs are visible.

Pars Thoracica: Arched, radial grooves distinct, but not deep, rear margin slightly indented.

Thoracic Fovea: Very indistinct.

Marginal Band: Narrow, yellow, not fringed with hairs.

Eyes: Front row strongly recurved and longer than the rear row, which is strongly procurved. The eyes of the front row are slightly larger than the corresponding eyes of the rear row. All the eyes except the front laterals are mounted on black rings. The space between the front medians is

equal to once their individual diameter, and is slightly greater than the space between the rear medians. The front and rear laterals of the same side just touch each other. The space which separates the rear medians from the rear laterals is equal to about half the diameter of a front median eye, and the same distance separates the front medians from the front laterals.

Legs: Relative lengths, 4, 1, 2, 3; slender, lightly clothed with stiff, straight bristles. The legs are yellow in colour except the tips of all the tarsi and the femur, patella, and tibia of leg. I., which are brown, and metatarsus I., which is very pale yellow, almost white. The comb on tarsus IV. consists of a row of twenty setæ, the eight nearest the claws have two teeth each, the eight nearest the metatarsus are bare, while the middle four have a single tooth each.

Palpi: Short, yellow, clothed with short bristle-like hairs, which are more numerous on the tarsus than on the other segments. The single claw is long, fine, and provided with two pectinations.

Falces: Vertical, strong, reddish yellow, clothed with a few short dark brown bristles.

Maxillæ: Yellow, long, narrow, furnished with a well-developed serrula and clothed with a few scattered hairs.

Labium: Yellowish, semi-circular, appears to be continuous with the sternum being separated therefrom by a shallow indistinct groove.

Sternum: Yellow, covered with brown tubercles, each of which is provided with a hair. It is twice as long as broad, its greatest breadth being between the coxæ of legs II.; ends in a point between the fourth coxæ.

Abdomen: Long and vermiform, being nearly seven times the length of the cephalothorax. The upper surface is dark fawn mottled with brown, whilst the under surface is fawn. The whole surface is thinly covered with short yellow hairs and with brown tubercles like those on the sternum. The anterior margin of the upper surface is fringed with long dark brown hairs which project forward over the base of the cephalothorax. The abdomen terminates in a blunt rounded extremity.

Epigynum: Takes the form of a rounded elevation about 0.5 mm. from the base of the abdomen.

Spinnerets: Situated 2.3 mm. from the base of abdomen.

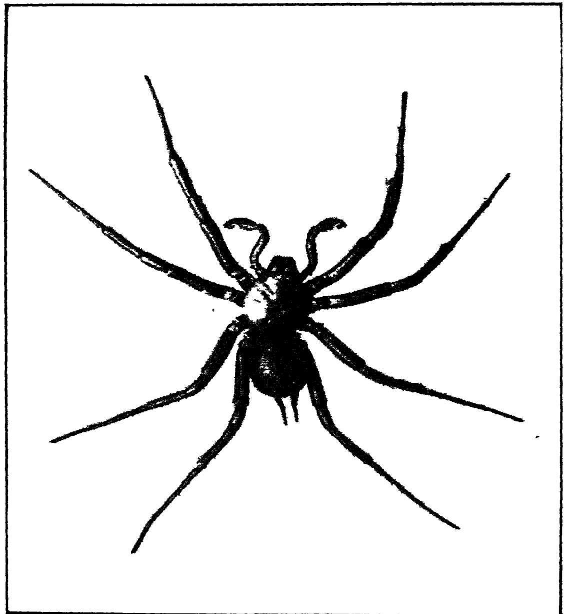


Fig. 9. *Hexathele montanus* (*sp. nov.*) ♂.

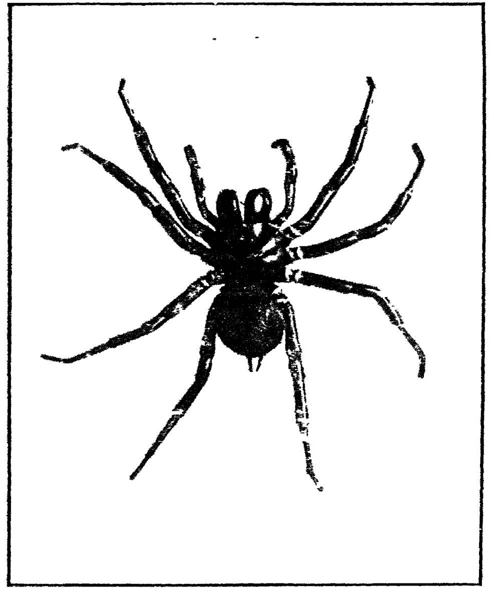


Fig. 10. *Hexathele montanus* (*sp. nov.*) ♀.

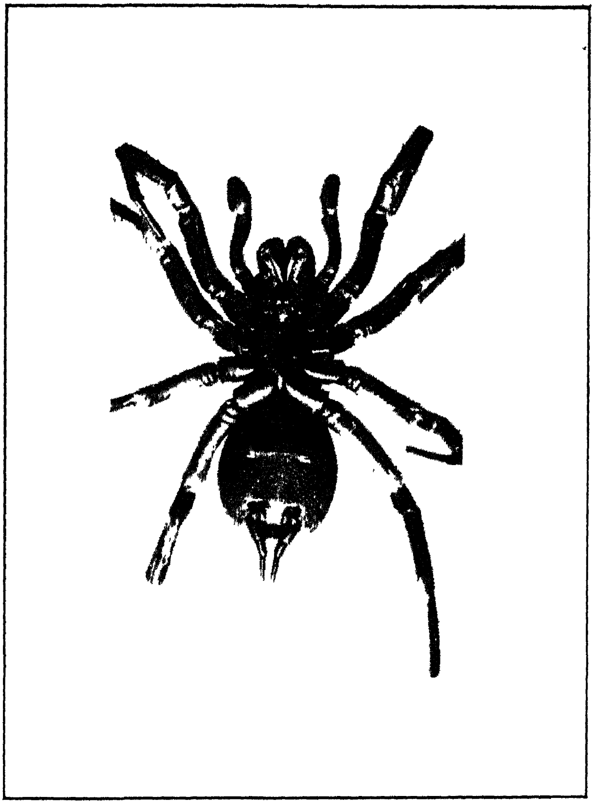


Fig. 11. *Hexathele montanus* (*sp. nov.*) ♀
showing the six spinnerets.

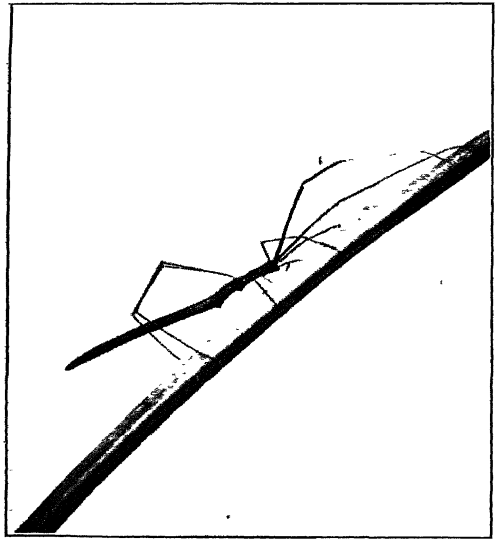


Fig. 12. *Ariamnes patersoniensis* (*sp. nov.*) ♀.

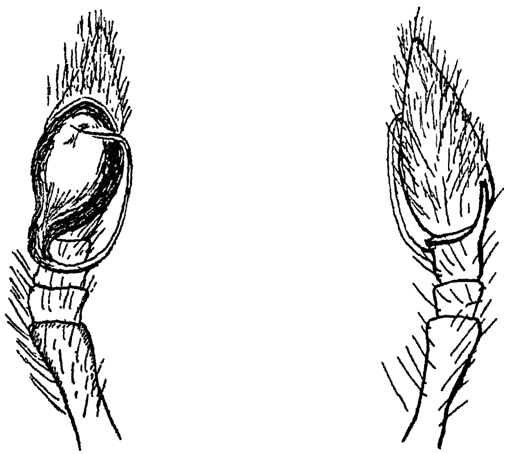
Fig. 13. *Ariamnes patersoniensis* (*sp. nov.*) ♀.
Egg sac.

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	0.24	0.90	0.97	1.18	3.29
2	0.22	0.83	0.85	1.15	3.05
3	0.22	0.77	0.82	1.12	2.93
4	0.29	1.12	1.18	1.55	4.14
				Tarsus	
Palpi	0.17	0.42	0.28	0.42	1.29

The male closely resembles the female, differing only in size and in the following features:—

Legs: Each of the two tarsal claws has a single blunt pectination and the tip of the claw is finely serrated.

Palpi: Short, clothed with plumose hairs, no spines present. The tibial segment is produced into an apophysis which ends in a bifid point. The genital bulb is large. The style is long, and in the unexpanded bulb it curves back towards the base of the alveolus and then forward towards the apex, where its tip is bent under a hook-like conductor. (See Fig. 17.)



(a) (b)

Fig. 17. *Myandra bicincta* (Simon). Palpus of male—(a) from below, (b) from above.

In other respects the male resembles the female (see below).

The description of the female is as follows:—

Measurements in millimetres.

Total Length	2.8
Length of Cephalothorax	1.1
Breadth of Cephalothorax	0.9
Length of Abdomen	1.7
Breadth of Abdomen	1.0

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	0.33	1.23	1.31	1.36	4.23
2	0.31	1.13	1.18	1.60	4.22
3	0.28	1.04	1.04	1.47	3.83
4	0.45	1.60	1.60	2.08	5.73
				Tarsus	
Palpi	0.18	0.55	0.48	0.44	1.65

Cephalothorax: Ovate, narrow and rounded in front, shining, black; clothed with long and with short, silvery-white, plumose hairs.

Pars Cephalica: Narrow, arched, sloping gently forward; cervical groove not well marked.

Ocular Area: Slightly arched, broader than long.

Clypeus: Very steep, not as broad as the ocular area.

Pars Thoracica: Slopes steeply down towards the rear, indented at its rear margin, radial grooves not distinct.

Thoracic Fovea: Not present.

Marginal Band: Narrow, slightly reflexed, no fringe present.

Eyes: Anterior row procurved, posterior row strongly procurved. The eyes of the front row are equal in size, spaced evenly and moderately close. Rear median eyes oblong, with their long diameter transverse; they are slightly farther away from each other than from their lateral neighbours. The four median eyes occupy an area about equal in length and breadth, but narrower in front than in rear. Lateral eyes of the same side almost touching each other, the front slightly larger than the rear eye. (See Fig. 18.)

Legs: Relative lengths, 4, 1, 2, 3; legs I. and II. being almost equal in length. All the legs are clothed with plumose hairs. No scopula is present, but the ends of the tarsi are provided with bundles of tenent hairs. Coxæ are light brown in colour; femurs very dark brown; tibiæ I. and II. dark

brown above, light brown underneath; tibiæ III. and IV. nearly black. The two tarsal claws have no pectination. No spines present on the legs.

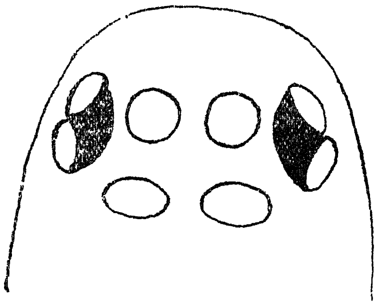


Fig. 18. *Myandra bicincta* (Simon). Eyes in female.

Palpi: Concolorous with the legs and of similar clothing. One or two spines are present on the tibial and tarsal segments.

Falces: Dark brown; fang is short, curved, and finely serrated. There are two teeth on the inner margin of falx sheath, three on the outer margin. Standing out from among the hairs near the base of the fang is a long conspicuous plumose hair. (See Fig. 19.)

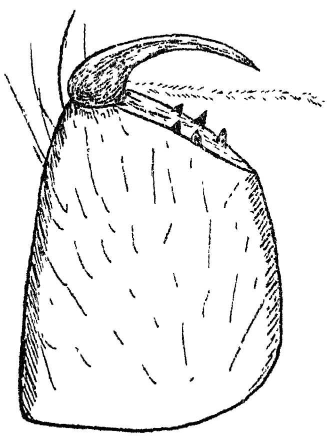


Fig. 19. *Myandra bicincta* (Simon) ♀. Falx.

Maxillæ: Dark brown, broad, inner margin fringed with a thick beard, a well-developed serrula at the apex.

Labium: Small, conical, truncated in front, and provided with long hairs at the apex; separated from the sternum by a well-marked groove.

Sternum: Broadly ovate, shining black, arched, produced into a sharp point between the fourth coxæ.

Abdomen: Long, narrow, rounded in front and in rear, black, decorated above with two transverse bands of white plumose hairs and a white spot near the apex. Under surface clothed with white plumose hairs.

Epigynum: A somewhat raised triangular opening, dark brown in colour. (See Fig. 20.)

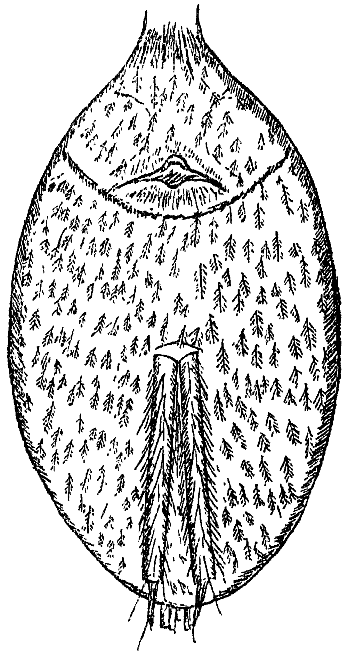


Fig. 20. *Myandra bicincta* (Simon). Abdomen of female from below.

Spinnerets: Inferior pair stout and long rising from the middle of the ventral surface of the abdomen and reaching to its apex. They are yellowish near the base, becoming gradually dark brown towards the tip. The other spinnerets are small and situated at the apex of the abdomen. (See Fig. 20.)

Locality: Lawrence Vale, Launceston. January, 1926.

Field Notes: *Myandra bicincta* is often found in company with the small black ants (*Camponotus nigriceps*, Smith), and to these it bears a superficial resemblance, when running quickly here and there in the sunshine on a garden path.

Types: The type specimens of spiders described in the above paper and also of those described in my previous paper (10) will be placed in the Queen Victoria Museum, Launceston.

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STUDIES IN TASMANIAN CETACEA.

PART V.

Mesoplodon layardi, Gray.

By

H. H. SCOTT, Curator of Queen Victoria Museum, Launceston,

and

CLIVE LORD, F.L.S., Director of the Tasmanian Museum, Hobart.

(Read 11th October, 1926.)

HISTORY.

The specimen under review was secured in Recherche Bay, D'Entrecasteaux Channel, during the winter of 1925, by Mr. H. Smith, and later the skeleton was obtained and has been articulated for the Tasmanian Museum collection. (Tasmanian Museum Coll. No. D.754.)

THE GENUS AND SPECIES.

As E. R. Waite has published in the Records of the South Australian Museum (1) a detailed description of a young male *Mesoplodon layardi*, and as the present specimen appears to be fully adult, it will be a useful comparison to construct our tables in terms of his; but, before doing so, attention is directed to the following notes upon the skull.

SKULL.

The skull, which is not quite intact, is 830 mm. long and 300 mm. wide at the *squamosal* regions. Its height from the par-occipitals to the vertex is 370 mm. The narial basin is 125 mm. wide and 112 mm. long, the limit in this direction being the actual bony depression which terminates at a line drawn across the two foramina. Narial asymmetry is not strongly marked, but standing behind the skull it can be noted that the right nasal aperture is slightly larger than the left. The mesorostral is completely ossified, the palatines, vomer, maxilla, and inter-maxilla having

all united to form a solid bony beak. For 25 mm. in front of the narial basin there is a pit containing (2) perfectly hard, fenestrated bone, apparently the last remains of ethmoidal cells. In front of this the ossified mesorostral takes origin, and for the first 50 mm. of its length develops in the form of a groove 18 mm. wide, and manifests the minor asymmetry of the individual skull. For the next 75 mm. the bone contracts to about 8 mm. Thence, for the next 80 mm., it gradually expands to a maximum of 12 mm. — and lastly, for the next 230 mm., although retaining its width, it merges into the surrounding bones in an elongated area of depression. The present skull at its apex, namely, the common meeting place of the supra-occipital, the maxilla, inter-maxilla, nasals, and frontals, the whole of the bone is shattered by shot, dozens of which are still embedded in the bone.

Measurements of the girth of the beak, at points indicated above, give the following data:—

Girth at junction of area two and three	260 mm.
Girth at junction of area three and four	187 mm.
Girth at junction of area four and five	176 mm.
Girth at junction of area five and six	117 mm.

At the base of the skull the pterygoids are mutilated and except for a small moiety upon the right side the malars are missing—the fragment shows that at 40 mm. from its gomphosial origin it was only 2½ mm. in diameter. The mandibular symphysis is 280 mm. long, and a width between the posterior summit of the two teeth of 70 mm., the least anterior width being 35 mm. The teeth are 90 mm. long, and rise 35 mm. above the alveolar ridge. They are situated 210 mm. from the tip of the united rami. The coronoid is too mutilated to supply much evidence—apparently its depth was about 120 mm.

COMPARATIVE MEASUREMENTS.

Item.	Specimen described by Waite.	Tasmanian Whale.
Extreme length of Cranium	853 mm.	830 mm., incomplete.
Length of rostrum tip to antorbital notches	574 mm.	560 mm., ditto.
Tip of rostrum to end of palate	678 mm.	600 mm., mutilated at both ends.

Item	Specimen described by Waite.	Tasmanian Whale.
Height vertex to pterygoids	338 mm.	370 mm.
Breadth across orbits ..	328 mm.	300 mm., right side is mutilated.
Breadth at squamosals ..	256 mm.	315 mm.
Breadth at antorbital notches	197 mm.	200 mm.
Breadth in middle of rostrum	68 mm.	49 mm.
Breadth across condyles ..	115 mm.	110 mm.
Premaxilla greatest width behind anterior nares	156 mm.	no data (shot away).
Least width opposite anterior nares	110 mm.	118 mm.
Greatest width in front of anterior nares	111 mm.	122 mm.
Width of anterior nares ..	50 mm.	53 mm.
Length of tympanic	44 mm.	52 mm.
Width of tympanic	30 mm.	30 mm.
Length of ramus	742 mm.	no data, mutilated.
Length of symphysis	166 mm.	280 mm.
Height of ramus	113 mm.	120 mm.

Although fully adult, the rostral groves are strongly in evidence, and apparently would be so throughout life.

VERTEBRÆ.

The species is usually accredited with 48 vertebræ, 46 are present and the last two or more caudals are missing. The cervicals show the last three quite free, and upon maceration a fourth may become detached, but the remainder are firmly ankylosed into a solid block. The vertebral formula was apparently:—C.7, D.10, L.11, Ca.20. Total, 48.

The largest lumbar gave the following data:—

Centrum, 95 mm. wide x 85 mm. high.

Length of body, 118 mm.

Across diapophyses, 260 mm.

Greatest height, 386 mm.

Width of spine, 130 mm.

The rest of the skeleton conforms to published accounts, and is available for detailed study if needed.

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(2) *Review of the Cetacea of the New Zealand Seas.* By W. R. B. Oliver, F.L.S., F.G.S.

(3) *A Book of Whales.* F. E. Beddard, M.A., F.R.S., 1900.

TWO HYDROMEDUSOID RECORDS FOR TASMANIA.

By

PROFESSOR T. THOMSON FLYNN.

(Communicated by L. Rodway.)

(Read 11th October, 1926.)

Some plankton originally obtained from D'Entrecasteaux Channel, Tasmania (October, 1921), has been subjected recently to examination, one of the results being the discovery of two species of the Genus *Eutima* (*Leptomedusæ, Eucopidæ*) which can now be recorded for Tasmania.

One of these proves to be *Eutima pretiosa*, Haeckel, described in the *System der Medusen* in 1879. I have not seen the original description, but a summary of the specific characters is given by Mayer in *The Medusæ of the World*, Vol. II.

The locality given by Haeckel is "off the coast of "Australia." Apparently it has not been recorded since 1879.

The second specimen is even more interesting in that it appears to be specifically identical with *Eutima elephas*, Haeckel, found originally at Heligoland in 1854 (*System der Medusen*, 1879).

Mayer says that an apparently identical medusa appears each year at Tortugas, Florida, in July.

Our Tasmanian species appears to agree in every structural feature with the species described by Mayer.

While it may be questioned whether it is possible for one species to have such an extensive geographical range, the apparent identity of structural features compels the inclusion of this Tasmanian form in the species *elephas*.

In neither case was the colour of the medusa recorded. Mayer states that the hydroid stage of these medusæ is *Campanopsis*. Mr. E. A. Briggs, of the University of Sydney, a well-known authority on the Australian Hydrozoa, informs me (*in litt.*) that this latter genus has not been recorded from Australia.

NOTES ON, AND ADDITIONS TO, THE CHITON FAUNA OF NORTH-WEST TASMANIA, TOGETHER WITH A BRIEF REVIEW OF THE GENUS *STENOCHITON*.

By

EDWIN ASHBY, F.L.S., etc.

(Read 20th December, 1926.)

INTRODUCTION.

This paper was commenced over a year ago as a joint paper in collaboration with the late W. L. May, but was laid aside owing to the untimely death of Mr. May, whereby the writer has lost his greatest friend, who was his colleague on so many collecting trips, and Science has lost a conchologist of outstanding ability.

The earlier part of the paper records the results of a collecting trip to the north-western corner of the State. The party consisted of W. L. May, Watson Coleman, Miss Ashby, and the writer.

The 28th and 29th October, 1924, were spent at Robbins Island and the 30th and 31st at Penguin. Robbins Island from a collector's point of view was virgin ground. The main work was done in the two afternoon tides, and the reefs worked were those several miles to the west of the Homestead at Gyton Point. The rocks were diabase or allied igneous rock, the first day's work being confined to the most easterly of the series of reefs that form the western wing of the Homestead Bay, and on the second day, May worked some rock pools on the eastern side of the main reef while Coleman and the writer worked some very likely, somewhat sheltered ground on the western side, immediately below the Bluff upon which the Manager's House is situated. Each of these reefs was found numerically rich in examples but limited in species; so much so that we decided to shorten our stay, in order that some work might also be done at Penguin, before the passing of the low tides.

The work done on the main reef was through an unfortunate circumstance incomplete; as that was the only spot where a representative of the subgenus *Rhyssoplax* was taken, it is certainly worthy of a more thorough investigation. Ashby was the only one of the party that was able

to get out on the reef at Cape Elio near the Homestead, at one of the early morning tides. While the work on that ground yielded no additional species, it was remarkable for the great number of *Ischnochiton lineolatus*, Bl., that were found there, whereas at the three places worked at the western wing of the bay, less than 3 miles away, very few examples of this species were met with. At the latter places, *I. subviridis* was in hundreds, but at the eastern reef the numerical strength of the two species was about equal. The rocks and conditions at each wing of the bay were equally promising, and the reasons for the astonishing discrepancy are not patent. This instance should be a warning to all workers not to assume too readily that a species is necessarily absent from a locality, because one has not found it at the few reefs one has been able to work. The discovery of representatives of the two genera, *Stenochiton* and *Lepidopleurus*, new to the State is of particular interest.

Class AMPHINEURA

Order *POLYPLACOPHORA*, Blainville.

Suborder EOPLACOPHORA, Pilsbry, 1900.

Family LEPIDOPLEURIDÆ, Pilsbry, 1892.

Genus *Lepidopleurus*, Risso, 1826.

Lepidopleurus matthewsianus, Bednall, 1906.

=*L. niger*, of Torr, and *Terenochiton erratus*, of Hull.

A nice series was taken at Robbins Island mostly on the reef immediately below the Mutton Bird Rookery and the Manager's House; most of the examples are pale biscuit colour with bright red bodies, a feature which is characteristic of the species. Only one example has previously been recorded from Tasmania, and that was taken at Devonport. The type locality is Marino, in South Australia, the specimens from which the description was made were given to Bednall by the writer, and came from that locality. The same species was found by Torr at Hopetoun, in Western Australia, and described by him under the name *L. niger*, and later on was found at King George Sound, in the same State, by Hull, and described by him under the name *Terenochiton erratus;* both these names are synonyms of the species under review.

Lepidopleurus badius, Hedley and Hull, 1909.

While much less numerous than the preceding species, a nice series was taken at Robbins Island living in the same sit-

uation as *matthewsianus;* most of them are rufous or orange rufous in coloration, the largest measuring 4.5 mm. in length. The sculpture differs from that of *matthewsianus,* in the wider spacing of the longitudinal rows and the wider spacing of the granules in the rows, in some examples these rows are ill-defined. This is the first record of this shell occurring in Tasmanian waters, and forms an interesting addition to its fauna. The writer has taken it at several localities in Gulf St. Vincent, in South Australia, and in 1923 at Port Stephens, in New South Wales, these places forming the extreme limits of its known range westward and northward The present record from Robbins Island extends its range considerably in a southerly direction. The species seems everywhere to be very local, but this may be due to its minute size making it easily overlooked.

Lepidopleurus profundus.

Lepidopleurus profundus (Ashby MS.) May. Illus. Index, Tas. Shells, 1923.

L. profundus of Ashby, Trans. Roy. Soc. S. Aust., vol. xlvii., read May, 1923.

Parachiton collusor of Iredale and Hull. Aust. Zool., vol. iii., pt. viii., 1925, p. 346.

Parachiton profundus of Iredale and Hull, l.c.

Introduction.—The late W. L. May quite unintentionally published Ashby's name *profundus* a few months prior to the publication of his type description, publishing only a figure without definition. Good as the figures are, without reference to Ashby's definitions, the fig. cannot be separated from *L. liratus,* Ad. and Ang., thus to make the reference complete it will have to be written *Lepidopleurus profundus* (Ashby MS.) May, 1923. Both May and the writer considered that the splitting of the genus *Lepidopleurus* into various genera as proposed or adopted by Iredale and Hull, has not up to the present been justified by adequate generic definitions. In illustration, Iredale and Hull, in their remarks on *L. profundus,* Ashby, state "This shell looks like "a deep water form of *Terenochiton liratus,* in which the "girdle scales have been replaced by spicules," and yet they place it in a different genus.

As before stated, it was originally intended to publish this paper as a joint one in collaboration with W. L. May, and on 30th June, 1925, he forwarded to the writer the shells from which he had made his drawings, in order that by

careful re-examination it might be ascertained whether there was any justification for the action of Iredale and Hull in making two species out of the examples described by Ashby under the name *L. profundus*, the following notes are the results of this re-examination.

Notes.—Iredale and Hull claim that the South Australian shell (type of *profundus* of Ashby) "compared with May's "*L. profundus*, the sculpture of the central areas is finer, "the mucro more posterior."

I have now carefully recompared Tasmanian examples from Pilot Station, D'Entrecasteaux Channel, Port Arthur, and Geographe Strait, with the type of *profundus* of Ashby. I find the character of the sculpture is identical, the longitudinal grooving in the median areas is a little broader in the type from South Australia than in most of the Tasmanian examples, and there is a tendency in those from Tasmania for the ribs to be a little broader, and in some the granulation is a little coarser, but there is as much variation in this respect between the different Tasmanian examples, in some cases between the different valves or portions of the same valve, in the same shell, as between the South Australian specimen and a paired example from D'Entrecasteaux Channel.

The type from South Australia, although not disarticulated, shows the whole of the dorsal portion of the tail valve, thus making it possible to take measurements, and this was possible only in the case of one very juvenile shell amongst the Tasmanian series.

As no disarticulated specimen was available to settle the question raised about the mucro, I disarticulated one medium sized example from the Pilot Station and found that the mucro is central, as is also that of the South Australian shell. Measurements were made under a microscope with the aid of a micrometer, but, finding the adjustment was loose, one had to discard these and content oneself with the use of callipers, which gave the following:—South Australian shell, 2 mm. between the anterior margin of tail valve and mucro, and between the posterior margin and mucro also 2 mm.. in the Tasmanian example the same measurements are respectively 1½ mm. and 1½ mm.

Conclusions.—

(a) Iredale and Hull's contention that the South Australian shell can be specifically separated from the Tasmanian on the grounds of the sculpture of the median valves is demonstrated to be incorrect.

(b) The contention that the mucro in the former "is "more posterior" than the latter, is unsupported, and can only exist in an unimportant degree in selected examples.

(c) The writer unhesitatingly endorses the opinion which the late W. L. May and himself jointly came to, and which has already been emphatically expressed in his paper l.c., viz., that the dredged shells from South Australia and Victoria described by himself under the name *L. profundus* are con specific with the Tasmanian shells figured by May under the same name; Iredale and Hull's name *Parachiton collusor* is a synonym of *Lepidopleurus profundus* (Ashby MS.) May.

(d) As it is believed that the publication of the name *profundus* by May, unintentionally preceded the publication by Ashby by a month or two, the two specimens figured by May, which were paratypes of Ashby's *profundus*, now become co-types of *profundus;* May's complete figure represents a shell dredged at Port Arthur, and the enlarged portion of a median valve is from a specimen dredged in nine fathoms off Pilot Station, D'Entrecasteaux Channel. The statement made by Iredale and Hull, l.c., p. 347, "That the foregoing description is the "first published of May's species" is of course in correct. Neither are they correct in stating that the shell figured by May was one of the original series, nor did it come from the Pilot Station, River Derwent.

Lepidopleurus profundus and *liratus* Compared.

In *liratus* the sculpture of the pleural areas consists of longitudinal rows of circular, convex, separated granules, which are bridged across from one row to another by irregular, ill-defined ridges. In *profundus* this sculpture consists of longitudinal, granulose ribs, the granulations in the ribs being flat-topped, and each granulose rib is bridged across to the next one by numerous, regular, well-defined narrow ridges.

The sculpture of *liratus* may be likened to a string of circular beads almost touching one another and roughly and widely bridged across from one row to another, whereas the sculpture of *profundus* is quite distinct, and may be likened to a longitudinal string of beads that have been squeezed together when soft and planed or flattened along the top and narrowly bridged across to the next rib at each granulation.

Suborder CHITONINA, Thiele, 1910.

Pilsbry places the *Ischnochitonidæ* and the *Mopaliidæ* earlier than the *Acanthochitonidæ*, in the order named, but Thiele considered this latter Family more primitive than the *Ischnochitonidæ*. Owing to the additional light thrown upon this group by the examination of examples of the fossil genus *Protochiton*, I place the Family *Protochitonidæ* immediately above the *Lepidopleuridæ*, considering that these forms were the progenitors of the *Acanthochitonidæ*, expressing it as my opinion that this latter family was never derived from the *Lepidopleuridæ*, but from an even more primitive stock, along parallel lines, and await the confirmation of this surmise by the discovery of intermediate fossil forms. Should this data be forthcoming a suborder *Protochitonina* will have to be introduced and the Phylum *Acanthochitonidæ* built up thereon. As now treated I cannot but think that the suborders *Eoplacophora*, Pilsbry, *Lepidopleurina*, Thiele, and *Chitonina*, Thiele, are taxonomically incorrect.

Family ACANTHOCHITONIDÆ, Hedley, 1916.

Subfamily ACANTHOCHITONINÆ, Ashby, 1925.

Genus *Acanthochiton*, Gray em. 1821.

Acanthochiton sueuri, Blainville, 1825.

Numerous at Robbins Island and less so at Penguin.

Acanthochiton bednalli, Pilsbry, 1894.

Found both at Robbins Island and Penguin, but in greater numbers at the former, it is easily distinguished by the deep longitudinal grooving in the dorsal areas; a few large examples were found at Port Sorell, one measuring 18 x 9 mm.

Acanthochiton granostriatus, Pilsbry, 1894.

Two examples were taken at Penguin, the dorsal area is narrower than in *bednalli*, is smooth except for growth lines, and is polished.

Acanthochiton variabilis, Ad. and Ang., 1864.

Not uncommon at Penguin, where some rather striking colour varieties were met with, it was not noted at Robbins Island, but several large specimens were secured at Port Sorell, one measuring 13 x 7 mm.

Genus *Notoplax*, H. Adams, 1861.

Notoplax glyptus, Sykes, 1896.

I am glad to be able to record this rare species as from Tasmania. A couple of specimens were in a collection made by the late Mrs. Alfred Smith, at one time resident at Swansea, on the East Coast; her daughter, Miss K. C. Smith, writes me that all the specimens in this collection were certainly Tasmanian, and adds "Chitons were especially peculiar "to the Swansea Beaches, and always after a storm we used "to find them in great numbers," and again, "My mother "collected some of her best specimens from the Stanley "Beaches, N.W. Coast." While there is not the slightest doubt that these examples were collected in Tasmania, the choice of locality is between Stanley and Swansea, the weight of probability is in favour of Stanley. The known examples of this shell are very limited, all have hitherto been credited to Victoria from Port Phillip Heads, Portsea, Western Port, and two examples taken from off the cable in Bass Strait by the late Mr. Joseph Gabriel in 1910. Mr. May first noticed a strange Chiton in this collection, which was still in its original glass case, and took the writer round to determine whether it was an undescribed species or not. The two specimens were presented us by the present owner, Miss P. Bailey, of Hobart—one is in Mr. May's collection, the other in my own. The following are particulars of this latter specimen: The shell is curled, girdle wasted, and semi-transparent, with a few exceptions the spicules have disappeared from the sutural pores, but in a few cases the bases of the spicules are retained. The valves are in excellent preservation with the exception of a fracture of one median valve; the shell is highly polished, the ground colour greyish green, flecked and mottled with ivory white; the pleural areas show four broad but shallow longitudinal grooves, the rest of shell is smooth and highly polished. In one of the small specimens taken off the cable, now in my collection, the ground colour is creamy white with a slight greenish shade in the mottling, the sutural hairtufts are furnished with slender spicules, and short spicules are scattered about the girdle. The specimens in the Smith collection have evidently been washed up, the body being absent, I indicate Stanley as the probable locality.

Subfamily CRYPTOPLACINÆ, Thiele, 1910.

Genus *Cryptoplax*, Blainville, 1818.

Cryptoplax striatus, Lamarck, 1819.

This was a common species at Robbins Island, examples measuring up to 80 mm. in length dry. In "A Review of "the genus *Cryptoplax*" (Trans. Roy Soc. S. Aust., vol. xlvii., 1923), the writer pointed out that specimens from King Island had shorter and broader spicules than examples from South Australia, the type locality, and he considered from his examination of Reeve's type of *gunni* in the British Museum, that the King Island shell might well be referred to that variety. As both forms exist side by side in the southern part of Tasmania the character mentioned hardly deserves distinguishing with a name as a variety. Iredale and Hull (Aust. Zool., vol. iv., pt. ii., 1925), under *C. iredalei*, Ashby, refer to May's fig. pl. xvi., no. 7, as if it was intended for the form with short slender spicules described by the writer under the name *C. iredalei*. This is an error, May's figure was intended I believe to depict Reeve's *var. gunni*, and this means that Iredale and Hull's name *C. iredalei meridiana*, must be considered a synonym of *gunni* of Reeve. I have not seen their type.

Cryptoplax iredalei, Ashby.

Several examples of this shell were secured at Robbins Island, the largest measuring over 70 mm. in length when dry. This species can easily be separated from the common form *C. striatus*, in that *iredalei* has short and slender spicules, giving a velvety appearance to the girdle. Both May and the writer considered that hitherto the only example recorded from Tasmania was a single example taken by May on his return from King Island in November, 1922, I think at Devonport. The occurrence is recorded by the writer, l.c., p. 238. Thus Robbins Island forms an interesting extension of its Tasmanian range.

Family CALLOCHITONIDÆ, Thiele, 1910.

Subfamily CALLOCHITONINÆ, Thiele, 1910.

Genus *Callochiton*, Gray, 1847.

Thiele proposed a subgenus *Icoplax* with *C. puniceus*, Couthony, as type, a New Zealand species. Iredale and Hull l.c. propose to elevate *Icoplax* to full generic rank, but the characters referred to in their definitions can only be

considered as of specific or at most subgeneric value, and until adequate generic characters are defined I prefer to leave *C. mayi* under the genus *Callochiton.*

Callochiton mayi, Torr, 1912.

A nice specimen, 10 mm. in length, of this striking and rare *Callochiton* was taken at Penguin in a rock pool at the lowest point of the tide. It was the second example the writer has taken, the other having been collected in the D'Entrecasteaux Channel, in Southern Tasmania. The only records other than Tasmanian are Portland, Victoria, 1 example, and several dredged by Sir Joseph Verco in South Australian waters.

Genus *Eudoxochiton,* Shuttleworth, 1853.

Subgenus *Eudoxoplax,* Iredale and May, 1916.

Both May and the writer were agreed that Iredale and Hull l.c. have furnished no justification for their proposal to elevate *Eudoxoplax* into generic rank. We considered it was not generically separable from *Eudoxochiton,* and doubted as to whether even subgeneric separation was justified. Decision on this latter point must be left to a careful investigation.

Eudoxochiton (*Eudoxoplax*) *inornatus,* Ten.-Woods, 1881.

One example taken at Penguin.

Family MOPALIIDÆ, Pilsbry, 1892.

Genus *Plaxiphora,* Gray, 1847.

Plaxiphora albida, Blainville, 1825.

A few examples were taken at both Robbins Island and Penguin, all of which are the costate and wrinkled form; limitations of available time prevented the collecting of more material to enable one to determine the extent of variation in the respective localities. Thiele seems to have had very few examples available to him for examination, and to have found the variation so great, that he was led to suggest a different name (almost) for each example. One had hoped that Iredale and Hull would have given the time to enable them to make an exhaustive examination of a large series, but this has not been done. They reproduce Thiele's figures of *costata, albida, tasmanica,* and *bednalli,* and allow only the two former. I have already pointed out (Trans. Roy. Soc. S. Aust., vol. xlvi., 1922, p. 575) that both Blainville's types were conspecific, the fact that this was so having been overlooked by Thiele through the valves of the type of *albida*

having had the original sculpture eroded, but in one median valve sufficient coarse wrinkling is present to determine its character — unfortunately the name *albida* has page precedence. It is absurd for Iredale and Hull to attempt to retain both names. Thiele, in view of the apparent absence of coarse wrinkling in the eroded type of *albida*, concluded that it must be conspecific with the "microscopically wrinkled" or smooth shell, which was described by Quoy and Gaimard under the name *Chiton glaucus*, the type of which was shown to me in Paris.

To make confusion worse confounded Iredale and Hull have reversed the application of Thiele's letterpress. His drawing of *costata* is a poor one, as it does not show the, what we now term, coarse wrinkling, which is very much in evidence in the type which was handled by Thiele and referred to and drawn by him under the name *costata*.

Genus *Kopionella*, Ashby, 1919.

Kopionella matthewsi, Iredale, 1910, *var. intermedia*.

Three examples were taken at Penguin, each having the peculiar "oar-headed spicules" which were discovered by the writer and described by him in 1919, the generic name being founded on this feature coupled with the distinctive shape of the tail valves, as major characters.

The Penguin specimens correspond with the South Australian shell in the coarse granulose character of the two radial ribs of the lateral areas, and in the girdle being furnished with numbers of "oar-headed spicules" placed irregularly around the whole girdle, but the "oar-heads" are not as broad as in *matthewsi*, neither are they bent over as in that species as it is known in South Australia, the type State.

The examples from D'Entrecasteaux Channel, in Southern Tasmania, described by the writer under the name *tasmanica*, possess few of these spicules and their swollen extremities are long, slender, and straight (stiletto shape). It is quite difficult to determine to which species these examples from Penguin are most nearly allied. Until more material is available I suggest recognising them as a variety of the type species under the varietal name *intermedia*, the characters defined as above.

Note.—In 1910 Iredale proposed the name *Plaxiphora matthewsi* for specimens received from South Australia. In 1916 Iredale and May figured a Tasmanian specimen under the same name and genus, either through having overlooked the existence of "oar-headed spicules" or because in the

examples they examined this feature had been removed through careless handling. Iredale and Hull l.c. have now placed this genus immediately following the genus *Loricella,* a possibility that was foreshadowed as possible by the writer in his definition of the genus *Kopionella;* but Iredale and Hull supply no new data in support of this treatment. I prefer to leave the genus under the *Mopaliidæ* until one has time to study the radula in this relationship.

They remark that the "South Tasmanian form has been "differentiated specifically, but no such value is apparent in "the series examined by us," . . . . "the only feature for "separation appears to be in the formation of the corneous processes." These gentlemen have in a number of cases treated differences "in the formation of corneous processes" (i.e., girdle scales) as of the value of generic distinction; it is indeed regrettable that in this case they are not prepared to recognise such characters as of even specific value, and it is unfortunate that they did not avail themselves of the opportunity offered to them to see the types of this and other species.

Family ISCHNOCHITONIDÆ, Pilsbry, 1892.

Subfamily ISCHNOCHITONINÆ, Pilsbry, 1892.

Genus *Ischnochiton,* Gray, 1847.

Ischnochiton lineolatus, Blainville, 1825, *non lineolatus* of Iredale and Hull.

Iredale and Hull propose to recognise in this species *Chiton elongatus* of Blainville, but do not advance the slightest shred of evidence in support of their proposal, neither do they attempt to controvert the apparently incontrovertible evidence advanced by Dupuis, Lamy, and the writer, in support of the recognition in *Ischnochiton crispus,* Reeve, the *Chiton lineolatus,* Blainville, the type of which is still in the Museum de Histoire Naturelle, Paris, and has been carefully examined and compared, by each of the foregoing. The whole question has been fully discussed by the writer (in Trans. Roy. Soc. S. Aust., vol. xlviii., 1924, pp. 329-330). The type locality for this shell is King Island, where it was collected by Péron and Lesueur in 1802; three of the original examples collected by them are now in the writer's collection and written on the inside of the shell of one, in faded ink, but still quite legible are the words "ile King" presumably in the handwriting of one of the famous explorers and naturalists.

As has already been mentioned, this species was scarce on the reefs below the Manager's House, but very numerous at the rocky point near the Homestead. Both sites appeared equally suitable, so the reason for this preference is quite obscure. At Penguin and Port Sorell it was numerous, and at all the localities the species is very variable in colour, pattern, and sculpture. At both Robbins Island and Penguin a variety occurs that has not been noticed elsewhere—it has a grey black central band with light coloured scalloped edging, and is an almost perfect imitation of a dark form of *Ischnochiton subviridis*, which also seems peculiar to those localities.

Ischnochiton atkinsoni, Iredale and May, 1916.

=*I. a. lincolnensis* of Ashby.

=*I. variegatus* of Iredale and Hull, *non* of Angas.

Was fairly common at both Robbins Island and Penguin. It is discussed at some length later in this paper.

Ischnochiton iredalei, Dupuis, 1918.

Subspecies *kingensis*, Ashby and Hull.

I. iredalei, Dupuis=*I. lineolatus* of Iredale and Hull, *non* of Blainville.

Synonymy given fully by Ashby (Trans. Roy. Soc. S. Aust., vol. xlviii., 1924, p. 329).

This species was in great numbers at both Robbins Island and Penguin and noted at Port Sorell. Many specimens measured 40 mm. in length, but what was most remarkable about the whole series was the extraordinary variation in both colour and pattern. In South Australia (type locality by designation) except in juvenile shells, there is but little variation in colour, pattern, and sculpture, whereas in the three dozen N.W. Tasmanian examples mounted on card before me, all but one specimen, which is large, worn, and pale, are easily distinct from any example

Note.—The writer has recently discussed with Messrs. Gatliff and Gabriel the advisability or otherwise of retaining the name *Chiton pallidus* of Reeve for this shell. On the following grounds we have decided not to accept the name *pallidus*, but to return to the name *I. iredalei*, Dupuis.

The type of Reeve's *Chiton pallidus* is worn smooth, the description is consequently ineffective, the locality is unknown. While I am still of the opinion that Reeve's type is probably a worn example of *I. iredalei*, Dupuis, the accuracy of such an identification can only be determined by disarticulation of the type which may or may not reveal sufficient existing sculpture for determination. I concur with the gentlemen named, in rejecting identifications founded on mere opinions, without the support of adequate data. I therefore retract my identification and agree to consider *Chiton pallens* of Reeve, as a non-Australian shell, until such time as the production of additional data may disprove this course.

seen from the mainland. The colour varies from rose pink, through orange to dark reddish brown, grey brown, and greenish grey, practically all extensively darkly streaked or mottled; the sculpture in all good examples is distinctly sharper and coarser than the South Australian form; it seems well to retain the subspecific name for the King Island and Tasmanian shells to distinguish them as a geographic race. If, later on, material from the northern side of Bass Strait should demonstrate that there is a gradual transition from the typical form to that of the Tasmanian, *kingensis* will then have to be relegated to the rank of a variety only.

Ischnochiton versicolor, Sowerby, 1840, *var. milligani*, Ire. and May.

Ischnochiton proteus, Reeve, 1847, *var. milligani*, Ire. and May.

Two or three examples only were taken at Robbins Island. They are easily distinguished by the large size of the girdle scales. On the mainland typical *versicolor* merge into *milligani*, and it can therefore only be considered a variety.

Since drafting this paper, I have, in conjunction with Mr. J. H. Gatliff, compared Sowerby's figures (Mag. Nat. Hist. IV., 1840, p. 292, figs. 75 and 122) with *I. proteus*, Reeve, and we concur with Iredale and Hull in considering them conspecific.

Ischnochiton virgatus, Reeve, 1848.

A few examples of this charming little shell were taken at Robbins Island. Hitherto the only record of its occurrence within Tasmanian waters is that of King Island and Clark Island. It certainly should be found along the coast between Robbins Island and Penguin. It is remarkable that it has hitherto been overlooked.

Subgenus *Haploplax*, Pilsbry, 1894.

Ischnochiton (*Haploplax*) *smaragdinus*, Angas, 1867.

Common at Robbins Island and Penguin and noted at Port Sorell. At the two former localities the variation in both pattern and coloration was very great. Some of the colour schemes that we have considered as characteristic of Port Jackson re-occur here; two examples from Robbins Island are 30 mm. in length, a size that is only equalled in South-East Tasmania and there very rare.

Subgenus *Heterozona*, Carpenter, 1878.

This section of the genus *Ischnochiton* was treated by Pilsbry as a subgenus; Iredale and Hull grant it full generic rank, but furnish no definitions that can be considered of generic value. The subgenus *Heterozona* is defined by Pilsbry (Man. Con., vol. xiv., p. 65), "Shell like normal "*Ischnochiton;* girdle bearing small scales with large striated "scales intermingled." Type *I. cariosus.* The writer noticed some years ago that *I. fruticosus,* Gould, from Port Jackson, was apparently identical with *cariosus* with the exception that the "large striated, intermingled scales" are not developed as maturity is reached, as is the case with *cariosus.* It was my intention to point out the affinity of these two and to suggest the suppression of the subgenus *Heterozona* on the ground that the accident of the appearance of these large scales in mature examples of *cariosus* can have no other than specific value. Now Iredale and Hull place *fruticosus* (and quite correctly so) next to *cariosus,* a species with which it certainly has the closest affinity, but instead of suppressing the subgenus *Heterozona,* they elevate it to full generic rank and place with it in that genus a species which exhibits none of the defined subgeneric characters, a course that seems absurd. I have, for the purposes of this paper, retained the subgenus *Heterozona* for the two following species, hoping at some future time to revise the subgeneric definition, and if deserving, place it on a more stable basis. I submit that variation in the epidermal clothing of the girdle cannot, unless supported by more important features, be considered as having the value of generic distinction. *Note.*—The writer (in Proc. Roy. Soc. Vict. 33 (N.S.), 1921, p. 151), in error, omitted the generic name *Ischnochiton* before the subgeneric name *Heterozona.*

Ischnochiton (*Heterozona*) *cariosus,* Pilsbry, 1873.

Several examples ranging up to 36 mm. in length, were taken at Robbins Island and one at Penguin. This species, although very common in South Australia, seems to be rare in Tasmania, and has only been recorded from the North Coast. Westward it extends around Cape Leeuwin and up the west coast as far as Dongarra.

Ischnochiton (*Heterozona*) *subviridis,* Iredale and May, 1916.

This species was astonishingly abundant at Robbins Island, especially the reefs to the west of the Bay. There I should estimate that they formed 90 per cent. of the Chiton

fauna. While varieties of various green shades and patterns exist, the great majority are black or blackish grey. In some cases all marking is absent, but in most there is evidence of lateral whitish banding, forming a longitudinal stripe bordering the black dorsal stripe. These black forms seem peculiar to this north coast and occur on black diabase rock.

Genus *Ischnoradsia*, Shuttleworth, 1853.

I here reproduce in full a note by the late W. L. May, of Sandford, Tasmania, which formed an addendum to the writer's Review of the Australian members of this genus (Trans. Roy. Soc. S. Aust., vol. xlii., 1918, pp. 62-64), "Having been "more or less associated with my friend, Edwin Ashby, in "his investigation into *Ischnoradsia*, I am thoroughly in ac- "cord with his treatment in the present communication. From "a superficial glance at specimens from the various localities, "they appear as one species, in shape, size, and colour, and "this impression is confirmed by an examination of the "girdle, which is practically the same in all.

"To maintain the several separate species, viz., *aus- "tralis*, *evanida*, and *novæ-hollandiæ*, we have to rely solely "on the absence or presence, in varying degrees, of the "longitudinal sculpture; and as this can be shown to be "quite inconstant in the southern and western shells, and "as some of these approximate rather nearly to the Port "Jackson form, it seems necessary to treat them all as mem- "bers of one variable species, but for convenience to main- "tain *evanida* for the southern and generally smoother form "either as a subspecies, which is perhaps preferable, or as a "variety."

This Chiton was numerous at both Robbins Island and Penguin, and from both places examples vary from those in which longitudinal ribbing is absent, through all stages of broken longitudinal ribbing to those in which these ribs traverse the whole area. One example taken at Penguin has distinctly coarser sculpture than is exhibited in a perfect, well-grown specimen taken by the writer at the Quarantine Station, Port Jackson, in 1918. Iredale and Hull recognise two full species, *australis* and *evanida*, and two subspecies, *divaricata* and *novæ-hollandiæ*. The examination of the material before me does not, in my opinion, justify such treatment. It is noteworthy that the juveniles of all are identical.

Stenochiton cymodocialis, Ashby, 1918.

Several examples of this shell were taken at Robbins Island on a small bed of the Sea Grass *Cymodocea*, and about a score taken on the cylindrical stems of the same plant at Penguin. The examples exhibit the variation characteristic of the species; the largest was from Robbins Island, and measures 13.5 mm. in length.

This is the first record of the occurrence of a member of this genus on the Tasmanian coast line, and one example of *S. longicymba* is credited by Blainville to King Island. This is discussed later.

Subfamily CALLISTOPLACINAE, Pilsbry, 1892.

Pilsbry associated with his genus *Callistochiton, Nuttallina, Craspedochiton, Angasia, Callistoplax*, and *Ceratozona* under the subfamily name *Callistoplacinæ*. Thiele removed *Craspedochiton* into his subfamily *Acanthochitoninæ*, though, as I have elsewhere shown, probably through mistaken identity, he was unacquainted with its true characters. Thiele then placed *Callistochiton* under the subfamily *Ischnochitonina* immediately following his genus *Tonicina*. It seems to me that the issues involved need additional research, basing such revision on the combined characters of the insertion plate and the radula. It seems that no one has up to the present attempted or been qualified to codify the classification of Polyplacophora on the basis of these dual taxonomic features; therefore, as far as possible one attempts to correlate existing taxonomic work rather than make rash departures. The peculiar "festooned" character of the insertion plate in *Callistochiton*, which was pointed out by Pilsbry, seems, failing the production of evidence to the contrary, sufficient grounds for the preservation of Pilsbry's name of *Callistoplacinæ*, but if the genus *Callistoplax* is definitely removed from association with the genus *Callistochiton*, then we must introduce the name *Callistochitoninæ*.

Genus *Callistochiton*, Carpenter, 1882.

Callistochiton meridionalis, Ashby, 1918.

One example of the variety of this species, described by the writer under the name *mayi*, was taken at Penguin and measured 20 mm. in length. This variety in which the reticulate sculpture of the very juvenile shell is retained beyond that stage of growth, seems peculiar to the N.W. Tasmanian coast.

Family CHITONIDÆ, Pilsbry, 1892.

Subfamily CHITONINÆ, Pilsbry, 1892.

Genus *Chiton*, Linne.

Subgenus *Rhyssoplax*, Thiele, 1893.

Chiton (*Rhyssoplax*) *oruktus*, Maughan, 1900.

One example only was taken in a deep hole far out on the reef below the Manager's House. Through a mischance this particular reef was but superficially examined. The discovery of this shell was not noted until all arrangements had been made for the party's departure to Penguin: its occurrence here may be taken as an indication that this spot will justify a more exhaustive examination and may yield some surprises.

Chiton (*Rhyssoplax*) *calliozona*, Pilsbry, 1894.

In the Smith collection before referred to, were two specimens of this shell. The one in the writer's collection is curled and would measure, if flat, 30 to 40 mm. in length. Both are interesting in having extensive areas of the shell coloured dark brown. The general colour varies from a greenish tinge to various shades of drab, the general effect being much paler than is this species in South Australia. It was probably collected at Stanley. It has rarely been taken in Tasmania, and then only on the northern coast.

Subgenus *Sypharochiton*, Thiele, 1893.

The writer, in common with many other conchologists, has in the past been in the habit of following Iredale's dictum in the giving of generic rank to names originally proposed as of subgeneric value only.

Thiele, neither in his original work (Das Gebiss der Schnecken, ii., p. 365), nor in his later one (Revis. des Syst. der Chitonen) considered either of his genera *Rhyssoplax* or *Sypharochiton* to rank other than subgenera or sections. He defines their distinguishing characters chiefly on the radula, and as far as we are aware, no one has since carried the study of Chiton radula further. While writers may be justified in adopting his divisions on the data he supplies, I fail to see why, without defining additional generic factors, anyone is justified in following Iredale and Hull in according full generic rank to these groups.

Chiton (*Sypharochiton*) *pellis-serpentis*, Quoy and Gaimard, 1835.

This species was very common at Robbins Island, Penguin, and Port Sorell. A fine series was taken varying

from shells in which the pleural area had no longitudinal ribbing, to those that possessed coarse almost beaded longitudinal ribbing. Some of the specimens certainly can be paired with examples from New South Wales. The writer in his paper on the Chiton fauna of Port Stephens in that State uses the following words in connection with this species: "Messrs. Iredale and May distinguished the Tasmanian "forms of this shell, under the designation of *Maugeanus*; "while I think the better way would be to consider them "mere varieties of the New Zealand shell, if students prefer "to consider the Tasmanian shell a geographic race, I suggest "that the somewhat more highly sculptured form found in "New South Wales be distinguished by the subspecific name "*septentriones*, a name suggested by the more northern habi-"tat." The results of a joint examination by W. L. May and the writer, as to the validity of separating the Tasmanian, New South Wales, and New Zealand shells from one another was published in Trans. Roy. Soc. S. Aust., vol. xlvi., 1922, p. 21. The following quotation will suffice: "We can-"not agree with Iredale and May in separating the Tasmanian "shells from the New Zealand ones, or from those from New "South Wales. Pilsbry, in his paper on 'Port Jackson "Chitons' (1894), also states that he was unable to detect "any difference between New South Wales and New Zea-"land shells, therefore *S. maugeanus*, Iredale and May, be-"comes a synonym of *S. pellis-serpentis*, Quoy and Gaimard." Iredale and Hull now do not recognise *S. pellis-serpentis* as an Australian species and grant full specific rank to *maugeanus* and *septentriones* as representing the Tasmanian and New South Wales shells respectively, which is a course which I consider is without any justification whatsoever.

Lepidopleurus variegatus, H. Adams and Angas, P.Z.S., 1864, 192.

Iredale and Hull (in Aust. Zool., vol. iii., pt. vi., 1924) propose to recognise this species in *Ischnochiton atkinsoni lincolnensis*, Ashby (Trans. Roy. Soc. S. Aust., xliv., 1920, p. 275, pl. xii.). The type figured and described was from Port Lincoln, South Australia, and not San Remo, Victoria, etc., as quoted. Iredale and Hull state "The type of *I. variegatus* "is at present missing, but we figure a neotype collected for "us by Mr. E. H. Matthews, at Minlacowie, Hardwicke Bay, "South Australia, the exact locality whence Angas describ-"ed it." They do not supply the slightest justification for their assertion that the specimen described by Adams and Angas came from Minlacowie, Hardwicke Bay, Spencer's

Gulf. The habitat as given in the type description as quoted by Pilsbry is "Yorke's (correctly spelt without the s) Penin-"sula, S. Australia, under stones at low water (Angas)." The habitats of *Hanleya variabilis*, A. and A., and *Lepidopleurus liratus*, Ad. and Ang. are also given in the same words. I have been informed that Angas did a good deal of collecting near Edithburg, on Gulf St. Vincent opposite to Adelaide, Yorke Peninsula, and we have hitherto believed that that was the type locality for the three species named.

Iredale and Hull further remark: "This species was "well described but not figured, and was recognised by Pils-"bry, Bednall, Matthews, and Torr, but Ashby, through an "oversight, neglected it, and re-described it as a form of *I.* "*atkinsoni*, I. and May, naming it *I. a. lincolnensis*." The facts are that Ashby left it out of his consideration because he was aware that Pilsbry placed *L. variegatus*, Ad. and Ang., under his list of "Insufficiently described Chitons," and that Bednall personally considered it a variety of *I. crispus* now *lineolatus*, Bl., and that Torr was of the same opinion. The only oversight was in making no mention of so discredited a name.

Reasons for not accepting *I. variegatus*.

(a) The type specimen was never figured.

(b) The type was lost.

(c) The description is insufficient for determination, as distinguishing specific characters are not given. It will apply equally as well to varieties of the common *I. lineolatus* as to *lincolnensis*.

(d) Bednall's, l.c. p. 146, adds no information to the original description beyond colour patterns, which are not determining factors in specific separation. He alleges that, having sent examples, Pilsbry approved of the identification, but does not quote him as having given any reasons for same.

Matthews has not as far as I am aware published anything *re* same. Torr (Trans. Roy. Soc. S. Aust., vol. xxxvi., 1912) states in reference to *variegatus*: "It is probably a "cream coloured variety of *crispus*"=*I. lineolatus*.

(e) The writer has found both *I. lineolatus*, Bl., and *I. a. lincolnensis*, Ashby, living together in equally plentiful numbers on the coast of Yorke Peninsula within a few miles of Edithburg.

The only determining factor in the separating of these two very variable species is the size and fluting of the girdle

scales, a feature that was unrecognised and completely ignored as a means of comparison in the original description and by Bednall and Torr. For convenience it will be more satisfactory to consider *Lepidopleurus variegatus*, Ad. and Ang., as a synonym of *I. lineolatus*, as representing one of its varietal forms.

Ischnochiton atkinsoni, Irc. and May, and *I. a. lincolnensis*, Ashby, discussed.

Iredale and Hull l.c. accept two species describing one under the *I. variegatus*=*I. a. lincolnensis* on page 230 and *I. atkinsoni* on page 237. The descriptions will do equally well for either with the following exceptions:—

(a) They introduce nine species between their description of the South Australian shell and that of the N.W. Tasmanian shell.

(b) They refer to a colour distinction which is most inconstant, more often absent than present.

(c) *Variegatus* is described as "semi-carinated" and *atkinsoni* is described as "round-backed, not carinated."

(a) Needs no discussion. (b) Of the 19 specimens on my card from the type locality of *lincolnensis*, i.e., Port Lincoln, in South Australia, less than half of the examples possess the lateral banding they refer to, and they vary in colour from almost white through shades of biscuit colour to the orange rufous that is so common in examples of *atkinsoni* from N.W. Tasmania; in other parts of South Australia and Victoria the variation of colour, pattern, and absence of pattern is much greater still. (c) In some of the Port Lincoln examples, especially near the beak, the jugum is slightly raised "semi-carinated," in others the shell is "round-backed not carinated," but this "semi-carination" is also met with, although more rarely, in examples from N.W. Tasmania. Thus we have to admit that this slight variation is neither of specific nor subspecific importance and *lincolnensis* is conspecific with *I. atkinsoni*, Ire. and May.

Ischnochiton atkinsoni bruniensis, n. subsp.

On collecting a good series at Robbins Island and Penguin, the type locality (Sulphur Creek is a local name of a suburb), we noticed at once the resemblance to some of the Mainland forms heretofore recognised under the subspecific name of *lincolnensis*. The mistake had occurred in this

way. The only available co-types of *atkinsoni* were more or less eroded, and although W. L. May in 1917 picked out two or three from examples of the original lot of Port Lincoln specimens, which he considered as "typical" of the Tasmanian *atkinsoni*, when early in 1920, he, with the writer, collected a long series of *atkinsoni* in the D'Entrecasteaux Channel, Southern Tasmania, it became possible to compare the Port Lincoln shells with these, when the subspecific differences were defined in the writer's paper (Trans. Roy. Soc. S. Austr., xliv., 1920, pp. 275-276).

It is now clear that the shells from D'Entrecasteaux Channel were not typical *atkinsoni* and require a subspecific name, I therefore suggest *bruniensis* after the Island from which the earliest specimens were collected. A slight amendment of the description l.c. will meet the case. By substituting for the words "Tasmanian shell" Bruny Island shell, and for the words "Mainland shell," *I. atkinsoni*, Ire. and May, we have the following definition: "Under a simple lens the "rugged character of the sculpture of the Bruny Island "shell is most consistent, whereas *I. atkinsoni* s.s., always "seems to have a polished appearance, and the granulose "sculpture is less in evidence." Iredale and Hull, in their description of *I. atkinsoni*, l.c. p. 237, use the words "central "areas coarsely quincuncially granulose, granules rounded "and flat-topped." In the definition of *bruniensis* as compared with *atkinsoni* s.s., the word very, must be inserted and read as follows: "Pleural area in median valves, very coarse"ly quincuncially granulose, granules round and convex, not "flat-topped, the interspaces being much deeper than in *at*"*kinsoni* s.s." The coarse nodulose radials referred to in the type description of the lateral areas of *I. atkinsoni* are as variable in that species, whether from the mainland or from N.W. Tasmania, as they are in *bruniensis*. The specimen I have selected as type comes from Lunawanna, Bruny Island, and measures 12.5 x 6 mm. There is no doubt in the writer's mind that if the eleven examples on card examined were mixed up with any number of *atkinsoni* from either side of Bass Strait, the specimens from Bruny Island could easily be sorted out. Its treatment as a subspecies seems well justified, but if, later, intermediates are discovered, it would have to be treated as a variety, occurring at the southern extremity of the range of *atkinsoni*.

Genus *Stenochiton*, Ad. and Ang., 1864.

Pilsbry considered *Stenochiton* deserving of subgeneric rank. In his paper on this genus (Trans. Roy. Soc. S.

Austr., vol. xlii., 1918), the writer proposed the elevation of *Stenochiton* to full generic rank on external and internal grounds. In the Classification List in "Victorian Naturalist," vol. xliii., No. 1, issued May, 1926, he only ranked it as a subgenus of genus *Ischnochiton*, because in the face of a number of new genera proposed by Iredale and Hull, many of which, in the writer's opinion, are unsupported by any true generic definitions, he preferred to review the position he took in his Monograph l.c. Now, having reviewed the position, he confirms his original opinion, supported as it is by the multislitting of the insertion plates, often in the median valves as well as in the end valves, and the specialised character of the shell.

Stenochiton posidonialis, Ashby, 1918

=*S. pilsbryanus*, of Iredale and Hull.

The writer in his paper on the genus *Stenochiton* l.c. showed that Bednall's figures and description of his *S. pilsbryanus* (Proc. Mal. Soc. Lon., vol. 2, pt. 4, 1897, pp. 142-3) not only could not be identified with the above, but did not coincide with any known form. The fact that collectors had sent away specimens of *S. posidonialis* under the name *S. pilsbryanus* did not, in his opinion, seem to affect the question. He showed both by description and figures, that in *S. posidonialis* the anterior valve is concave and not convex as stated by Bednall, also that in *S. posidonialis* the tail valve is very flat, entirely different from the figure of that valve as supplied by Bednall in his type description. The suggestion made by Iredale and Hull that juvenile shells of *S. posidonialis* may not show any concavity in the anterior valve is not supported by an examination of a number of specimens of a similar size to Bednall's type, viz., 5.75 mm., as all have exhibited this feature.

The writer would have liked to find a way out of the dilemma both in accordance with the wishes of Dr. H. A. Pilsbry and in harmony with the International Rules, and will reserve a final review of this problem till a later date.

Stenochiton tatei, n.sp.

Stenochiton tatei, Ashby, a new name for the shell described by Ashby under the name *Stenochiton* (*Zostericola*) *pilsbryanus*, Bednall (Trans. Roy. Soc. S. Austr., vol. xliii., 1919, pp. 66-69, pl. xi., figs. 2, 2a, 2b, 2c).

The writer has always been in doubt as to the validity of his having attached the name of *S. pilsbryanus*, Bed., to the new species he described in 1919 (l.c.), it having been

done with the desire of preserving that name in connection with a valid species. The refusal of Iredale and Hull to accept that course reopens the question, and I take this opportunity for supplying a new name for the shell then described under the name *Stenochiton* (*Zostericola*) *pilsbryanus*, Bed.

In my paper (l.c.) it was pointed out that the species under description was broad and short, instead of, as is the case in other known forms belonging to this genus, being "long and narrow," and because of this fact suggested the subgeneric name of *Zostericola* for its reception, but on further consideration it would seem better to enlarge slightly the conception of the genus *Stenochiton*, by slight emendations and the insertion of the word "usually" into Adam and Angas's Definition thus—*Amended Definition of genus Stenochiton*: Shell unusually elongated, highly polished, almost unsculptured; convex, i.e., rounded or arched as distinct from carinated, plates of insertion small, multifissate in end valves and usually more than one slit in median valves; girdle covered with minute, polished, imbricating scales; living on Sea-Grasses.

It is not necessary to repeat the description published by the writer under the name *S. Z. pilsbryanus*, Bed., l.c., as that now becomes the type description of *Stenochiton tatei*, Ashby, and the example figured and described becomes the type. But the following comments and data are supplied as supplementary to that description. The dried type of *S. tatei* measured 5.5 x 3 mm., but if well preserved probably would have measured 6 x 3.5 mm. It has every appearance of being an adult shell. Iredale and Hull under *Stenochiton pilsbryanus*, p. 286 l.c., include "?*Zostericola pilsbryanus*, "Ashby"; adding the note, "Which may be a juvenile example "of *S. pallens*." If they had taken the trouble to compare the co-type of *pallens*, which they had had on loan, with the photo accompanying the description of this species, they would at once have seen that the peculiar elongation and tapering of the tail valve of *pallens* was entirely absent, for while the photo is not first class, it sufficiently demonstrates this fact.

Stenochiton longicymba, Blainville, 1825.

Chiton longicymba, Blain. Dict. Sci. Nat., vol. xxxvi., p. 542.

Stenochiton juloides, Ad. and Ang. (Proc. Zool. Soc., 1864, p. 193).

In Proc. Mal. Soc. Lon., vol. xv., pt. v., June, 1923, was published a paper by the writer entitled "Notes on the genus

"*Stenochiton* and the discovery and recognition of the type of "Blainville's *Chiton longicymba* in *Stenochiton juloides,* Ad. "and Ang." In it he referred to Thiele's description of a Chiton mounted on a card in the Paris Museum and labelled *Schizochiton nympha,* Rochebrune. Thiele identified it with the genus *Stenochiton,* but expressed his opinion that it was not conspecific with either *juloides* or *pallens.* Ashby then quoted as follows from "Misnamed Tasmanian Chitons," Iredale and May: "There is certainty that Rochebrune renamed "the Blainvillean species, and that *Chiton longicymba,* Blain- "ville, is a *Stenochiton.* Thiele does not definitely make this "a synonym of *Stenochiton juloides,* Ad. and Ang., and until "King Island specimens are again collected, we prefer to "allow *Stenochiton longicymba,* Blain., as a separate species." Ashby then gave details of his comparison of the type of *S. nympha,* Roch., with examples of *juloides,* and points out that the specimen belongs to that form of *juloides* that is "variegated or streaked with white," as is so well expressed in Blainville's description. Iredale and Hull, in their paper entitled "A Monograph of the Australian Loricates," l.c., Oct., 1924, do not refer in any way to Ashby's paper or his identification of Blainville's species with *S. juloides,* Ad. and Ang., neither do they supply a reference to the paper which was read in March, 1923, and of which Iredale had early advice. They remark on page 285 l.c., "Iredale and "May, familiar with Rochebrune's idiosyncrasies, recognised "in Thiele's figures the long lost *longicymba* of Blainville. "As Hull and Ashby did not meet with the species on King "Island, and Hull found it very common at King George "Sound, W. Aust., Hull suggested that the latter locality was "the source of Péron's specimen." They then state: "Ile "King, errore=Kangaroo Is." In the first place, Ashby was never in King Island, and the only published reference to the possibility of the type having come from Western Australia is in a paper giving the results of the collecting trip to King Island of May, followed later by Hull (Aust. Zool., vol. iii., pt. ii., issued March, 1923, by Ashby and Hull).

I strongly dissent from the attempt to remove this interesting species from the recorded fauna of Tasmania on the following grounds:—

(1) It was absolutely impossible for either May or Hull to have made an exhaustive investigation of such a large field as King Island within the limits of the time available to them.

(2) Hull noted beds of the sea-grass *Cymodocea*, but found no examples of *S. cymodocialis*, but we are certainly justified in assuming its presence there, now that the writer and May have discovered this species both at Robbins Island and at Penguin on the North-West Coast of Tasmania. Here it was overlooked by both Torr and Atkinson, who both did much collecting at the latter place.

(3) For example.—*Ischnochiton lineolatus*, Blain., which was described as from King Island, was quite rare at the three reefs worked jointly by May, Coleman, and Ashby at Robbins Island, but on the Eastern reef near Homestead, Ashby found it in very large numbers. Port Stephens in N.S.W. had been examined by both Brazier and Hull, who reported it very poor in Chiton fauna, whereas Thackway, May, and the writer, in 1923, located a spot there which was extremely rich in this fauna, one of the richest in Chiton fauna in that State.

These illustrations will suffice to show the unwisdom of disallowing King Island as the type locality for *Stenochiton longicymba*, on such slender evidence.

ECOLOGY AND RANGE OF HABITAT.

S. cymodocealis, Ashby, living on the cylindrical stems of *cymodocea*, range extending from Penguin and Robbins Island in Tasmania, along the South Australian coast and up the western coast as far as Geraldton.

S. posidonialis, Ashby, living on the flat stems and leaves of *Posidonia*, chiefly just above the sand, range extending along the South Australian and Western Australian coast and up the West Coast as far as Dongarra.

S. longicymba, Blainville, living in the brown basal sheaves, buried in the sand, of *Posidonia*, range extending from King Island in Tasmania along the whole of the southern coast of Australia and up the west coast as far as Garden Island.

S. pallens, Ashby, a few examples only, dredged by Sir Joseph Verco in Gulf St. Vincent, and one dredged at Port Phillip Heads in Victoria.

S. tatei, Ashby, type off *Zostera ? Posidonia*, Troubridge Shoal, Gulf St. Vincent, and ? one juvenile off *Posidonia* in the same Gulf.

Probably the whole of these species extend into the North Tasmanian Region

A SHORT KEY TO SPECIES OF STENOCHITON.

Head valve, anterior slope slightly to strongly convex	*longicymba, cymodocealis, pallens, tatei.*
Head valve, anterior slope concave	*posidonialis.*
Tail valve elevated	*cymodocialis, longicymba, tatei, pallens.*
Tail valve shallow, flat, slightly concave	*posidonialis.*
Tail valve exceptionally long and tapering	*pallens.*
Tail valve short and rounded	*tatei.*
Mucro anterior to central ..	*cymodocealis, tatei, posidonialis* (anterior third example 5.5 mm. long).
Mucro posterior	*longicymba, pallens* (posterior third in co-type).

A NOTE ON *EUCALYPTUS JOHNSTONI*, MAIDEN.

By

L. RODWAY, C.M.G.

(Read 20th December, 1926.)

Some years ago Mr. T. B. Moore discovered, on the range between New Norfolk and the Huon district, a Gum-tree which appeared to be somewhat different from any with which he was acquainted. He described it in the Papers and Proceedings of the Royal Society of Tasmania, 1886, page 207, giving it the name *Euc. muelleri*. This name was unfortunate, as Miquel had already applied it to a form of *Euc. dumosa*, and Naudin had used it for a variety of *Euc. ovata*. Maiden refers to it in the Critical Revision, Vol. 3, p. 160.

The name was allowed to remain till Maiden in the Revision, Vol. 6, p. 280, replaced it by *Euc. johnstoni* as some small recognition of the work done in botanical science by Robert Mackenzie Johnston.

The tree has since been observed on Mount Wellington, Mount Field, and many peaks to the west. It is not a good species, for though its typical form appears fairly distinct, yet every intervening condition between that and *Euc. gunnii* may often be met with. It appears as a zone at about two thousand feet altitude. In suitable habitat it becomes a noble tree, and produces an excellent timber of a pinkish colour. Fissile, heavy, and tough, it is eminently suitable for tool-handles, shafts, oars, and such, and should return excellent results if cultivated under proper conditions.

Locally it is commonly called Brown Gum.

NEW AND LITTLE-KNOWN TASMANIAN LEPIDOPTERA.

PART II.

BY

A. JEFFERIS TURNER, M.D., F.E.S., Brisbane.

(Read 20th December, 1926.)

Fam. ARCTIADÆ.

Amsacta eurymochla, n.sp.

εὐρυμοχλος, broadly barred.

♂. 48 mm. Head orange; face white. Palpi blackish; ochreous beneath towards base. Antennæ blackish; in ♂ very shortly bipectinate ($\frac{1}{2}$), becoming simple towards apex. Thorax white, with a longitudinal central blackish bar not reaching margins, and short lateral bars on shoulders. Abdomen orange above; white beneath; transverse blackish dorsal and ventral bars on each segment. Legs blackish; femora orange on dorsum, white beneath. Forewings triangular, costa straight to $\frac{3}{4}$, slightly arched posteriorly, apex round-pointed, termen slightly rounded, oblique; white; a blackish costal line almost to apex; extreme apex of costa orange; an orange subcostal line to $\frac{3}{4}$; a blackish line from near base, narrowly separate from preceding, to costa beyond it, expanded and giving rise to several dentate projections at its termination before apex; a median line confluent at base with preceding, and connected to it by a transverse bar at end of cell, there dividing into four lines along veins to termen; a subdorsal line from base to tornus, broadening and becoming dorsal before middle; cilia white. Hindwings with termen rounded; as forewings but without orange line; blackish lines broadly suffused.

This has probably been regarded as a form of *A. marginata*, and perhaps the Tasmanian record for that species has so arisen. To me it appears a distinct though allied species. In addition to the very distinct markings the forewings are shorter and broader.

Beaconsfield; two specimens received from Mr. W. B. Barnard, who has the type.

Fam. PHYCITIDÆ.

Ephestia cautella, Wlk.

Syn. *ficulella*, Barrett.

This species has now a worldwide distribution. It has been confused with *E. elutella*, Hb., of which I have not yet seen an authentic Australian example.

Ephestia kuehniella, Zel.

Very similar to the preceding. The distinguishing characters are well given by Meyrick in his "Handbook of British Lepidoptera." Not previously recorded from Australia, but I found two examples in the Littler collection.

Plodia interpunctella, Hb.

Another very widely distributed species. Like the two preceding it feeds on flour, maize, dried fruits, etc.

Fam. CRAMBIDÆ.

Platytes contempta, n.sp.

contemptus, despised.

♀. 24 mm. Head and thorax pale-brown. Palpi 7; pale-brown irrorated with fuscous, lower edge whitish. Antennæ brown-whitish. Abdomen whitish. Legs brown-whitish. Forewings narrow, posteriorly dilated, costa nearly straight, apex round-pointed, termen nearly straight, slightly oblique; pale-brown; an indistinct double discal dot at 2/3; a broad paler terminal fascia; cilia pale-brown. Hindwings over 2, termen slightly sinuate; whitish; cilia whitish.

Moina, Cradle Mountain Road (2,000 ft.), in January (W. B. Barnard); one specimen.

Fam. CARPOSINIDÆ.

Paramorpha eburneola, n.sp.

eburneolus, made of ivory.

♂. 16 mm. Head and thorax white. Palpi 6; white, basal half of lower edge dark-fuscous. Antennæ grey, becoming white towards base; ciliations in ♂ 1. Abdomen grey. Legs grey; posterior pair white. Forewings elongate, somewhat dilated, costa moderately arched, apex acute, termen nearly straight, strongly oblique; white with a very few scattered dark-fuscous scales; a pair of blackish discal dots at 2/3, one at each posterior angle of cell; a series of blackish dots around apex and on termen, those around apex larger; cilia pale-grey, on tornus white. Hindwings with termen sinuate; white; cilia white.

Allied to *P. rhachias*, Meyr., and *P. aquilana*, Meyr., distinguished by its white colour, total absence of costal strigulæ, and discrete blackish terminal dots.

Rosebery in February; one specimen.

Fam. TORTRICIDÆ.

Acropolitis ergophora, Meyr.

♂. 23-26 mm. ♀. 26-30 mm. Palpi in ♂ 2; in ♀ 2½. Antennæ of ♂ shortly obtusely dentate beyond middle, ciliations 1¼. Forewings in ♂ with fold moderately broad, reaching to 1/3.

Acropolitis ptychosema, n.sp.

πτυχοσημος, marked on the fold.

♂. 28-30 mm. Head and thorax grey; face fuscous. Palpi 3; fuscous; base and most of internal surface whitish. Antennæ fuscous; in ♂ slightly dentate, ciliations 1. Abdomen pale-grey. Legs fuscous mixed with whitish; tarsi annulated with whitish; posterior pair mostly whitish. Forewings suboblong, costa moderately arched, apex rectangular, termen rounded, slightly oblique; costal fold in ♂ moderately broad, reaching to 1/3; grey with patchy ferruginous irroration; no defined basal patch, median fascia, or costal triangle, but the latter two may be indicated by some darker grey suffusion on costa; a series of fuscous and ferruginous costal dots or short strigulæ; a blackish line on subdorsal fold from near base to middle, surrounded by some ferruginous suffusion; a short blackish median line from 1/3 not reaching 2/3, edged beneath with ferruginous, sometimes surrounded by dark-grey suffusion; sometimes an incomplete series of ferruginous strigulæ from 2/3 costa to termen above tornus; terminal edge interruptedly fuscous; cilia whitish-grey, sometimes suffused with ferruginous, sometimes with a few fuscous dots. Hindwings with termen slightly sinuate; 6 and 7 connate; pale-grey with transverse strigulæ of darker grey especially towards apex.

Characterised by the obsolescence of usual markings and ferruginous suffusion of forewings, and especially by the blackish streak on fold.

Cradle Mountain (3,000 ft.) in January; two specimens.

Gen. PARAPHYAS, nov.

παραφυας, an offshoot.

Palpi very long (over 6), porrect; second joint very long, shortly rough-scaled; terminal joint moderate. Fore-

wings with 7, 8, 9 long-stalked, 7 to termen. Hindwings with 3 and 4 connate, 5 curved and approximated to 4 at origin, 6 and 7 stalked.

Directly developed from *Capua*, from which it differs in the very long palpi, and stalking of 9 of forewings. The latter structure, rare in this family, has developed independently in several unrelated genera.

Paraphyas callixena, n.sp.

καλλιξενος, a pretty stranger.

♀. 18 mm. Head and thorax grey-whitish. Palpi 8; whitish, lower edge and apex fuscous. Antennæ pale-grey. Abdomen ochreous-whitish, Legs fuscous; posterior pair ochreous-whitish. Forewings dilated posteriorly, costa gently arched, apex round-pointed, termen straight, oblique; white; many, very fine, long, grey, transverse strigulæ from dorsum; a dark-fuscous basal costal dot; a triangular fuscous blotch on costa from 1/5 to 3/5, reaching rather less than half across disc, where its lower angle is obtusely truncated; a small, acute, fuscous, costal triangle at 4/5, giving rise to a grey line, or series of strigulæ, to 4/5 dorsum; a subterminal series of grey strigulæ; some small fuscous terminal dots; cilia fuscous, apices whitish. Hindwings with termen sinuate; grey-whitish; cilia grey, becoming whitish on dorsum.

Rosebery in February; one specimen.

Capua poliobaphes, n.sp.

πολιοβαφης, dyed grey.

♂. 18 mm. Head ochreous-whitish. Palpi 1½; fuscous; internal surface and upper edge ochreous-whitish. Antennæ grey; in ♂ slightly serrate, ciliations ½. Thorax and abdomen grey. Legs fuscous; tarsi annulated with ochreous-whitish; posterior pair except tarsi ochreous-whitish. Forewings subtriangular, costa moderately arched, apex pointed, termen nearly straight, slightly oblique; costal fold in ♂ narrow, reaching to middle; pale-grey sometimes slightly ochreous-tinged, more or less dotted with fuscous; a dorsal series of fuscous dots; a dark-fuscous discal spot at ⅔, sometimes divided into two dots; cilia ochreous-whitish, bases dark-fuscous. Hindwings with termen scarcely sinuate; 3 and 4 connate; grey-whitish with broad grey transverse strigulation; cilia grey-whitish.

Hobart and Mt. Wellington (2,500 ft.) in January (W. B. Barnard); two specimens.

Capua asemantica, n.sp.

ἀσημαντικος, insignificant.

♂. 14 mm. Head ochreous-whitish. Palpi 2; ochreous-whitish with a few fuscous scales. Antennæ grey; in ♂ slightly serrate, ciliations ½. Thorax and abdomen dark-grey; tuft ochreous-whitish. Legs fuscous; tarsi annulated with ochreous-whitish; posterior pair ochreous-whitish. Forewings subtriangular, rather narrow, apex pointed, termen nearly straight, oblique; costal fold in ♂ narrow, reaching 2/5; whitish; a series of dark-fuscous dots on costa and dorsum; a slender blackish median longitudinal line from 2/5 to 3/5; immediately beyond this a large defined square or triangular fuscous subapical costal spot, mixed with blackish; a fine blackish submarginal line or series of strigulæ before termen; cilia whitish-brown, bases partly fuscous. Hindwings with termen scarely sinuate; 3 and 4 connate; pale-grey sometimes with faintly darker strigulæ; cilia grey-whitish.

Allied to the preceding. As both are probably variable, it should be noted that this is considerably smaller, the forewings narrower, their termen more oblique, and the costal fold shorter.

Wilmot in January; Burnie in February; two specimens probably taken among tree-ferns.

Capua nimbosa, n.sp.

nimbosus, darkly clouded.

♀. 16 mm. Head brown-whitish. Palpi 2½; brown-whitish. Antennæ grey, towards base brown-whitish. Thorax brown. Abdomen dark-grey; tuft in ♀ very large. Legs ochreous-whitish; anterior pair partly fuscous. Forewings broadly triangular, costa rather strongly arched, apex pointed, termen nearly straight, oblique; whitish with grey transverse strigulæ; basal patch and median fascia grey, ochreous-tinged; basal patch well defined, posterior margin nearly straight; fascia from middle of costa, moderately broad on costa, greatly dilated towards tornus, but not quite reaching termen, anterior edge ill defined, posterior distinct, at first outwardly oblique, then curved parallel to and very near termen; a rounded dark-fuscous costal triangle from 2/3 to near apex, containing a white costal dot in middle; cilia grey with a subterminal dark-fuscous line. Hindwings with termen scarcely sinuate; 3 and 4 stalked; dark-grey; cilia grey.

Allied to *C. euphona;* characterised by the broad forewings, defined basal patch, very broadly dilated fascia, and dark-fuscous costal triangle.

Rosebery in February (W. B. Barnard); one specimen. There is also one example from Launceston in the Littler Collection.

Capua eugrapta, n.sp.

εὔγραπτος, distinctly marked.

♂. 14-16 mm. Head fuscous. Palpi 3; fuscous. Antennæ fuscous; ciliations in ♂ ¼. Thorax pale-brown with a few fuscous scales. Abdomen grey; tuft whitish-ochreous. Legs fuscous; tarsi annulated with whitish-ochreous; posterior pair whitish-ochreous. Forewings narrow, suboblong, costa gently arched, apex pointed, termen straight, oblique; costal fold in ♂ narrow, reaching 2/5; pale-brown; markings dark-brown mixed with blackish; a stout bar from base of dorsum to middle of disc at ¼; a rather narrow oblique fascia from costa before middle to dorsum before tornus, rather constricted in middle; a moderate costal triangle from 3/5 to near apex; a terminal fascia from beneath apex, sometimes confluent with first fascia at tornus; cilia pale-brown, bases sometimes darker, on apex sometimes with fuscous apices. Hindwings with termen slightly sinuate; 3 and 4 connate or stalked; whitish-grey with indistinct darker transverse strigulation; cilia whitish-grey.

Strahan in February; four specimens.

Capua thaleropis, n.sp.

θαλερωπις, fresh-looking.

♀. 15-16 mm. Head grey. Palpi 2½; grey. Antennæ fuscous with pale annulations. Thorax reddish-brown. Abdomen grey. Legs fuscous; tarsi annulated with ochreous-whitish; posterior pair ochreous-whitish. Forewings narrow, suboblong, costa moderately arched before middle, thence sinuate, apex round-pointed, termen nearly straight, oblique; reddish-brown; some dark-fuscous costal dots; a costal suffused triangular spot of darker brown sometimes mixed with blackish; cilia reddish-brown, apices paler. Hindwings with termen sinuate; 3 and 4 connate or stalked; pale-grey with faint darker transverse strigulation; cilia pale-grey.

Rosebery and Strahan in February; two specimens.

Capua cirrhoptera, n.sp.

κιρρόπτερος, yellowish-winged.

♂. 14-15 mm. Head and thorax ochreous-brown. Palpi 6; ochreous-brown. Antennæ ochreous-brown; in ♂ with tufts of long cilia (3). Legs fuscous; posterior pair ochreous-whitish. Forewings subtriangular, costa slightly arch-

ed towards base, thence nearly straight, apex pointed, termen sinuate, only slightly oblique; in ♂ without costal fold; pale ochreous-brown; terminal part of disc with some fuscous scales or dots, sometimes distinctly dotted; a fuscous discal dot at 2/3 on end of cell; cilia pale ochreous-brown. Hindwings with termen sinuate; 3 and 4 connate or closely approximated at origin; grey; cilia grey.

Cradle Mountain (3,000 ft.) in January; five specimens.

Gen. Epiphyas, nov.

ἐπιφυας, an offshoot.

Tongue present. Palpi moderately long, porrect; second joint with a triangular thickening of scales on upper surface; terminal joint short. Antennæ of ♂ ciliated. Thorax not crested. Forewings with all veins present and separate, 7 to termen. Hindwings with 3 and 4 stalked, or 4 absent, 5 approximated to 3 at origin, 6 and 7 separate, but approximated for some distance.

Type *E. eucyrta*. A derivative of *Tortrix*, from which it differs only in the stalking or coincidence of 3 and 4 of hindwings. In structure it approaches *Apinoglossa*, Möschler, in which the tongue is said to be absent; this genus is recorded from the West Indies, and is probably an independent derivative of *Tortrix*.

Epiphyas eucyrta, n.sp.

εὔκυρτος, well curved.

♂ ♀. 18-22 mm. Head and thorax reddish-brown. Palpi in ♂ 3, in ♀ 3½; reddish-brown. Antennæ whitish, towards apex grey; ciliations in ♂ 1. Abdomen whitish. Legs brown; posterior pair whitish. Forewings suboval, costa strongly arched, apex rounded, termen nearly straight, oblique; in ♂ without costal fold; reddish-brown, usually broadly suffused with brown-whitish towards costa and termen, numerous reddish-brown dots more apparent in suffused area; sometimes a brown-whitish rather broad suffusion on dorsum before middle; sometimes three or four blackish dots before termen; cilia brown-whitish. Hindwings with termen slightly sinuate; 3 and 4 coincident, whitish or grey-whitish with transverse grey strigulæ; cilia whitish.

Rosebery and Strahan in February; five specimens.

A fifth ♂ example from "Gravelly Beach" near Beaconsfield has the forewings brownish-grey with dark-fuscous marks on dorsum at 1/3 and 2/3, and in the hindwings 3 and 4 are stalked, but diverge very slightly. I believe it is an abnormal example of this species.

Epiphyas chlidana, n.sp.

χλιδανος, soft, delicate.

♀. 20 mm. Head and thorax whitish. Palpi 3½; grey-whitish. Antennæ grey-whitish. Abdomen whitish. Legs pale-grey; posterior pair whitish. Forewings suboval, costa rather strongly arched, apex pointed, termen slightly sinuate, oblique; pale brown; a whitish costal streak from base to middle; some whitish suffusion along dorsum; cilia whitish-grey, on apex brown, on costa whitish. Hindwings with termen sinuate; 3 and 4 long-stalked, widely diverging; pale-grey: cilia whitish with a pale-grey basal line.

Rosebery in February (W. B. Barnard); one specimen.

Tortrix incompta, n.sp.

incomptus, unadorned.

♂. 17-20 mm. Head fuscous sometimes mixed with ochreous. Palpi 2½; fuscous mixed with ochreous. Antennæ fuscous; ciliations in ♂ 3. Thorax and abdomen fuscous. Legs fuscous; posterior pair whitish-ochreous. Forewings elongate-triangular, costa slightly and uniformly arched, apex rounded-rectangular, termen slightly rounded, slightly oblique; costal fold in ♂ strongly developed, extending to middle; fuscous, often with slight whitish or ochreous irroration towards termen, rarely this irroration extends over whole wing, more frequently there is none of it; sometimes two or three pale-ochreous dots on costa before apex; cilia fuscous. Hindwings with termen sinuate; fuscous; cilia pale-fuscous with a darker sub-basal line.

Mt. Wellington (2,500 ft.) and Cradle Mountain (3,000 ft.) in January; seventeen specimens all of the same sex.

Tortrix hemiphœna, n.sp.

ἑμιφοινος, half-reddish.

♂. 24-25 mm. Head and thorax brown. Palpi 2½; brownish. Antennæ grey; in ♂ dentate, ciliations 2/3. Legs whitish-ochreous; tarsi fuscous annulated with whitish-ochreous; anterior pair mostly fuscous. Forewings suboblong, costa strongly arched to middle, thence straight, apex subrectangular, termen straight, rounded towards tornus, slightly oblique; costal fold in ♂ narrow and rudimentary, but extending to middle; ochreous-whitish, with reddish strigulæ; terminal 2/3 suffused with reddish or fuscous-reddish sharply limited by an oblique line from 1/3 costa to beyond mid-dorsum; a rather large, faintly darker, basal patch angled outwards beneath costa; central fascia represented by an oblique fuscous bar from 1/3 costa to above middle of disc, where it

is slightly enlarged and angulated outwards; costal triangle scarcely indicated; three transverse lines of fuscous strigulæ towards termen, first from before tornus; second from tornus, third from mid-termen, varying in length, but not reaching costa; cilia reddish, basally mixed with fuscous, apices paler. Hindwings with termen slightly sinuate; whitish coarsely strigulated with grey; whitish with a grey antemedian line, on apex tinged with reddish.

Russell Falls in January; Zeehan in February; two specimens.

Tortrix ophiosema, Low.

We took a small series of this species in fern-tree gullies at Russell Falls and Strahan. It varies in the degree of development of the dark markings on forewings, and the central fascia may be interrupted and partly obsolete, but it is always easily recognised. As all our examples are of the male sex, it is still unsettled whether it may not be the same species as *T. dotatana*, Wlk.

Tortrix euides, n.sp.

εὐειδης, handsome.

♂. 25 mm. Head fuscous. Palpi 4; fuscous mixed with whitish and a few reddish scales. Antennæ fuscous; in ♂ slightly dentate, ciliations ½. Thorax with a small posterior crest; fuscous mixed with reddish and suffused posteriorly with whitish. Abdomen fuscous. Legs fuscous; tarsi annulated with whitish; posterior pair almost wholly whitish. Forewings suboblong, costa slightly arched, apex rounded-rectangular, termen nearly straight, slightly oblique; in ♂ without costal fold; whitish strigulated and suffused with grey; markings dark-grey strigulated with dark-red; a moderate basal patch, its outer edge oblique and nearly straight, from 1/8 costa to 1/3 dorsum; central fascia represented by a large triangular costal blotch from ¼ to 2/3, doubly angled beneath, the anterior angle occupied by a dark-red spot; a terminal fascia, its anterior edge distinct, wavy, dark-red, from 7/8 costa to tornus, including a wavy, dark-red, transverse line; cilia whitish, with basal and subapical grey lines. Hindwings with termen slightly sinuate; pale-grey with darker strigulations; cilia as forewings.

Mount Wellington (2,500 ft.) in January (W. B. Barnard); one specimen.

Tortrix loxotoma, n.sp.

λοξοτομος, obliquely divided.

♂. 21 mm. Head grey-whitish. Palpi 3; fuscous, base and inner-surface whitish. Antennæ fuscous; in ♂ slightly

dentate, ciliations 1. Thorax ferruginous-fuscous suffused with grey-whitish. Abdomen grey. Legs fuscous; tarsi annulated with whitish; posterior pair whitish. Forewings suboblong, costa moderately arched, more so towards base, apex pointed, termen slightly rounded, slightly oblique; in ♂ without costal fold; pale-grey becoming whitish towards dorsum; markings ferruginous-fuscous; a small basal patch, its edge angulated outwards; central fascia narrow, from 2/5 costa to tornus; a small costal triangle before apex; a small terminal fascia narrowing to a point at apex and lost in suffusion towards tornus; terminal part of disc suffused with grey, which unites markings into a large terminal blotch; cilia whitish, with a basal line partly grey, partly ferruginous, on apex fuscous. Hindwings with termen sinuate; grey-whitish strigulated and suffused with grey; cilia whitish with a pale-grey sub-basal line.

Mount Wellington (2,500 ft.) in January (W. B. Barnard); one specimen.

Tortrix acrothecta, n.sp.

ἀκροθεκτος, with sharp apex.

♂. 20 mm. Head and thorax fuscous-brown. Palpi 1½; brown. Antennæ fuscous-brown; ciliations in ♂ 1. Abdomen grey, tuft paler. Legs ochreous-whitish; anterior pair fuscous. Forewings suboblong, costa strongly arched before middle, thence straight, apex acute, slightly produced, termen sinuate, scarcely oblique; in ♂ without costal fold; pale fuscous-brown with slightly darker strigulæ: basal patch and median fascia absent; a small equilateral fuscous triangle edged with blackish dots on 2/3 costa; several fine lines of fuscous strigulæ before termen; cilia fuscous, on apex and tornus brown. Hindwings with termen slightly sinuate; whitish strigulated and partly suffused with grey; cilia grey-whitish.

This species agrees with *T. ocyptera*, Meyr., in its peculiarly shaped forewings.

Mount Wellington (2,500 ft.) in January; one specimen.

Tortrix astathmeta, n.sp.

ἀσταθμητος, unstable.

♀. 15-20 mm. Head and thorax ochreous-brown. Palpi 2½; ochreous-brown, sometimes with a few fuscous scales. Antennæ fuscous-grey. Abdomen fuscous-grey; beneath ochreous. Legs brownish; posterior pair paler; anterior and middle tarsi fuscous with whitish annulations. Forewings suboblong, posteriorly dilated, costa arched near base, thence

sinuate, apex rounded-rectangular, termen sinuate, not oblique; pale-ochreous-brown, sometimes pinkish-tinged, sometimes largely suffused with orange-ochreous; markings extremely variable, usually indicated towards costal and dorsal margins only, sometimes wholly obsolete, sometimes dark and well-developed, dark reddish-brown, sometimes with a few similar strigulæ between and beyond them; basal patch slightly rounded, usually indistinct or obsolete; central fascia from 1/3 costa to ¾ dorsum, narrow but occasionally slightly dilated toward dorsum, usually however obsolete except on costa, sometimes followed by a costal dot; costal triangle at 2/3, small but deep, not always present; cilia concolorous, sometimes blackish on and beneath apex. Hindwings with termen scarcely sinuate; pale-grey; apex ochreous-tinged; cilia pale-grey, towards apex whitish-ochreous.

Cradle Mountain (3,000 ft.) in January; fifteen specimens, all of the one sex. The shape of forewings is characteristic.

Tortrix polyphrica, n.sp.

πολυφρικος, much-rippled.

♂. 22 mm. Head and thorax grey. Palpi 2; grey. Antennæ fuscous; ciliations in ♂ 1. Abdomen pale-grey. Legs fuscous; tarsi with whitish annulations; posterior pair except tarsi whitish. Forewings suboblong, costa rather strongly arched, apex pointed, termen nearly straight, slightly oblique; costal fold in ♂ slight, reaching to ¼, triangularly dilated with long scales towards its apex; whitish, suffused with fuscous so as to appear grey; numerous fuscous dots on costa and in disc, some of them more or less connected to form imperfect wavy transverse lines or strigulæ; three larger spots in middle of disc at ¼, before middle, and at 2/3; cilia grey, sometimes with a few fuscous bars, bases white. Hindwings with termen sinuate; pale-grey; cilia whitish.

Cradle Mountain (3,000 ft.) in January; three specimens.

Tortrix alysidina, n.sp.

ἁλυσιδινος, made of chainwork.

♂. 24 mm. Head and thorax brown. Palpi 1½; brown. Antennæ brown; ciliations in ♂ 1. Abdomen pale-brown. Legs fuscous; posterior pair ochreous-whitish. Forewings suboblong, costa rather strongly arched, apex pointed, termen slightly sinuate, slightly oblique; costal fold in ♂ extremely rudimentary; brown; very numerous small fuscous dots arranged in rows between veins; a suffused fuscous longitudinal line above middle of disc from 1/3 to 2/3; cilia grey

with a basal brown line, apices pale-brownish. Hindwings with termen sinuate; pale-grey; cilia pale-grey, bases whitish.

Mt. Wellington (2,500 ft.) in January (W. B. Barnard); one specimen.

Tortrix schematica, n.sp.

σχηματικος, of distinctive pattern.

♂. 18-20 mm. Head and thorax fuscous. Palpi 2; grey-whitish. Antennæ fuscous; in ♂ minutely ciliated. Abdomen dark-grey. Legs fuscous; posterior pair ochreous-whitish. Forewings suboblong, costa gently arched before middle, thence straight, apex subrectangular, termen nearly straight, scarcely oblique; in ♂ without costal fold; ochreous-whitish with clearly defined fuscous markings; a moderate basal patch, its posterior edge slightly concave; a rectangular spot on costa at 1/3, widely separated from a larger similar spot on mid-dorsum; a triangular spot on 2/3 costa, its apex nearly or quite touching a large rectangular spot, which extends from tornus to middle of disc; a moderate terminal fascia becoming narrower beneath, where it joins tornal spot; cilia grey; apices whitish. Hindwings with termen scarcely sinuate; dark-grey; cilia grey.

Wilmot in January (W. B. Barnard); one specimen; a second example from Launceston in the Littler Collection.

Tortrix nephaula, Meyr.

Also from Mt. Erica, Victoria (Geo. Lyell).

Tortrix concinnula, n.sp.

concinnulus, rather neat.

♀. 13-14 mm. Head whitish-ochreous. Palpi 4; whitish-ochreous. Antennæ pale-grey with blackish rings. Thorax fuscous. Abdomen fuscous. Legs fuscous; posterior pair whitish. Forewings subtriangular, costa arched towards base, thence straight, apex pointed, termen straight, slightly oblique; white with slight fuscous irroration; markings fuscous mixed with brown; basal patch rather large but imperfectly developed, its posterior edge angulated outwards in middle; central fascia from 2/5 costa, moderately broad, oblique, dilated in disc, then narrowed almost to a point on 2/3 dorsum; a second fascia very broad on costa, where it encloses a central white dot, gradually narrowing but still moderately broad to dorsum before tornus; a line from costa before apex to termen below middle; cilia whitish with bars of fuscous and brown scales except towards tornus. Hindwings with termen scarcely sinuate; pale-grey with obscure darker strigulæ; cilia grey.

Mt. Wellington (2,500 ft.) in January (W. B. Barnard); two specimens.

Tortrix polymicta, n.sp.

πολυμικτος, intricate.

♀. 16 mm. Head ochreous-brown. Palpi 3½; brownish. Antennæ fuscous. Thorax fuscous mixed with ochreous-brown. Abdomen fuscous. Legs fuscous; tarsi annulated with whitish-ochreous; posterior pair whitish-ochreous. Forewings subtriangular, costa slightly bisinuate, apex pointed, termen straight, oblique; white with slight fuscous irroration; markings dark-fuscous; basal patch large, but not developed towards base, its outer margin acutely angled outwards; central fascia and costal triangle confluent, extending on costa from 2/5 to 4/5, its anterior edge nearly straight except in middle where it impinges on a blackish discal spot, its posterior edge acutely angled inwards in middle; two blackish costal dots included in costal triangle; a third dot beyond this, connected with a terminal fascia, dilated in middle, but not reaching tornus; cilia white partly suffused with brownish and with a few dark-fuscous points. Hindwings with termen sinuate; grey with obscure darker strigulations; cilia grey.

Mt. Wellington (2,500 ft.) in January; one specimen.

Tortrix dyschroa, n.sp.

δυσχροος, discoloured.

♂ ♀. 18-20 mm. Head pale reddish-brown. Palpi 2¼; pale reddish-brown. Antennæ grey, towards base pale reddish-brown, ciliations in ♂ 1¼. Thorax reddish-brown sometimes mixed with fuscous. Abdomen grey. Legs fuscous; posterior pair whitish-brown. Forewings suboblong, costa slightly arched, more so near base, apex rounded-rectangular, termen straight, rounded beneath, hardly oblique; in ♂ without costal fold; pale reddish-brown; markings slightly darker, indistinct, sometimes only partly traceable; a moderate basal patch, its outer edge angled outwardly in middle; central fascia from 1/3 costa, moderately broad on costa, dilated but faint or lost towards dorsum; a broad ill-defined terminal suffusion; cilia reddish-brown. Hindwings with termen slightly sinuate; grey; cilia grey.

Cradle Mountain in January; five specimens.

Tortrix tenuifascia, n.sp.

tenuifascius, narrow-banded.

♂. 15-16 mm. Head and thorax reddish-brown. Palpi 2¼; reddish-brown; Antennæ grey; ciliations in ♂ nearly 1.

Abdomen grey. Legs fuscous; posterior pair whitis wings Forewings suboblong, rather strongly arched near base, ases straight, apex pointed, termen straight, moderately obli, in ♂ without costal fold; ochreous-whitish partly suffused and strigulated with reddish-brown; basal patch suffusedly reddish-brown, quite undefined, and succeeded by several fine transverse lines; central fascia distinct, very narrow, almost linear, dark reddish-brown, from 2/5 costa to 2/3 dorsum; costal triangle represented by several more or less confluent spots, from which proceed fine reddish-brown lines or series of strigulæ to tornus and termen; occasionally slight fuscous suffusion on termen and apical part of costa; cilia whitish-brown. Hindwings with termen sinuate; grey; cilia pale-grey with a darker sub-basal line.

Moina (2,000 ft.) and Cradle Mountain (3,000 ft.) in January; five specimens.

Arotrophora castanea, Meyr.

Proc. Linn. Soc. N.S.W., 1910, p. 263.

♂ ♀. 20-23 mm. Head grey-whitish. Palpi 6; grey; upper edge grey-whitish. Antennæ grey; in ♂ thickened, dentate, ciliations ½. Thorax with a small posterior crest; pale-grey, sometimes mixed with reddish-brown, which forms a posterior spot. Abdomen grey. Legs fuscous; tarsi annulated with whitish; posterior pair whitish. Forewings suboblong, costa gently and uniformly arched, apex obtusely pointed, termen straight, oblique; whitish or grey with variable fuscous and reddish-brown suffusion; often a well-defined whitish-brown blotch occupying greater part of costal area from base to middle, reaching costa, or, if not, connected with it at ¼, but this may be wholly absent; a suffused fuscous costal triangle extending from ¼ to apex, usually distinct; some fine blackish dots arranged transversely on end of cell; often a whitish suffusion between this and tornus; often some reddish-brown transverse strigulæ before termen; cilia pale-grey with sub-basal and subapical fuscous lines. Hindwings with termen not or scarcely sinuate; pale-grey with obscure darker strigulæ.

Very variable in the markings of forewing. I have therefore redescribed it, though it appears to agree with Meyrick's species described from a single example with the locality Mount Lofty (?), South Australia.

Lake Fenton (3,500 ft.) in January; ten specimens.

Cnephasia gnophodryas, Low.

♂. 14-16 mm. Head ochreous-brown more or less mixed with fuscous. Palpi 3½; ochreous-brown mixed with fuscous. Antennæ grey, ciliations in ♂ 2. Thorax fuscous usually mixed with reddish-brown. Abdomen fuscous. Legs fuscous; tarsi annulated with ochreous-whitish; posterior pair except tarsi ochreous-whitish. Forewings subtriangular, costa gently arched, apex pointed, termen straight, oblique; in ♂ without costal fold; whitish with numerous wavy transverse fuscous lines more or less mixed with reddish-brown; basal patch moderate, its posterior edge angled outwards in middle; central area sometimes suffusedly whitish, the transverse lines being little developed, occasionally these are partly confluent toward costa and tornus, so as to suggest a central fascia; often a terminal fascia, dilated in middle, not reaching tornus; cilia fuscous, apices whitish, sometimes with whitish bars. Hindwings with termen sinuate; grey; cilia grey.

Variable; in nearly all the Mt. Wellington examples centre of disc is suffusedly whitish, but I did not observe this form in other localities. I think that the ♀ examples from Mt. Wellington, attributed by Mr. Meyrick to *mermera*, Meyr., belong to this species. I have a long series (26 examples) but all of the ♂ sex. It differs from *mermera* (of which I have both sexes) in its smaller size, forewings narrower and without ochreous tinge, longer palpi and antennal ciliations.

Hobart, Mount Wellington (2,500 ft.), Russell Falls, National Park (2,000 ft.), Lake Fenton (3,500 ft.), Wilmot, Moina (2,000 ft.), Cradle Mountain (3,000 ft.), Zeehan, in January and February.

Note.—I sent examples of this as a new species to Mr. Meyrick, who replies—"*Cnephasia gnophodryas*, Low., con-"fused by me hitherto with *tribolana*, which does not occur in "Tasmania; I now admit it is distinct. I have specimens "from Hobart and Mt. Wellington; Lower's was from Hobart. "Quite different from *mermera*, which occurs higher up on "Mt. Wellington, by form of basal patch." On reference to my series, which may be in better condition than Mr. Meyrick's examples, I cannot confirm this last statement, and am still in doubt as to the occurrence of *mermera* in Tasmania.

Cnephasia fractifascia, n.sp.

fractifascius, with broken band.

♀. 15-16 mm. Head whitish-ochreous or whi[illegible] Palpi 3½; whitish-ochreous. Antennæ grey. Thorax fuscous mixed with whitish-ochreous. Abdomen fuscous. Legs fuscous; tarsi annulated with ochreous-whitish; posterior pair ochreous-whitish. Forewings suboblong; costa gently arched, apex pointed, termen straight, oblique; whitish usually partly suffused with pale-ochreous and with some fuscous irroration; markings fuscous-brown; basal patch ill defined, represented by several parallel lines; central fascia represented by a moderate very distinct oblique bar from costa not reaching middle of disc, and a quadrangular tornal spot, the two widely separated; costal triangle small, its apex nearly or quite confluent with that of costal bar; sometimes a straight transverse, subterminal line, usually obsolete or represented by a costal dot only; a narrow, more or less defined, terminal fascia; cilia brownish or fuscous, apices whitish. Hindwings with termen sinuate; pale-grey with obscure darker strigulæ; cilia pale-grey.

Russell Falls, Lake Fenton (3,500 ft.), and Cradle Mountain (3,000 ft.) in January; four specimens.

Cnephasia contortula, n.sp.

contortulus, rather intricate.

♀. 18-21 mm. Head and thorax dark-fuscous with a few whitish scales. Palpi 3; dark-fuscous; base and extreme apex whitish. Antennæ dark-fuscous. Abdomen grey; tuft in ♀ large. Legs fuscous; tarsi annulated with whitish; posterior pair mostly whitish. Forewings suboblong, costa slightly arched near base, thence straight, apex pointed, termen nearly straight, slightly oblique; whitish with dark-fuscous irroration and markings; costa and dorsum strigulated and spotted; basal patch ill defined, partly represented by a median sub-basal spot, angulated outwards; central fascia rather narrow on costa at 1/3 and on tornus, much dilated and suffused in disc, with some tendency to interruption beneath costa; a dot on costa between this and costal triangle, which is small and may contain a central white costal dot; a costal dot beyond this; a rather irregular triangular terminal blotch; cilia whitish barred with fuscous and with a dark-fuscous sub-basal line. Hindwings with termen sinuate; pale-grey with darker strigulæ; cilia pale-grey with a darker sub-basal line.

Probably nearest *C. argyrocosma*, Turn.

Wilmot in February (W. B. Barnard); four specimens.

Fam. EUCOSMIDÆ.

Spilonota hypomolybda, n.sp.

ὑπομολυβδος, leaden beneath.

♂. 22-23 mm. Head and thorax fuscous. Palpi grey-whitish, outer surface fuscous except base and sub-basal and subapical bands on second joint. Antennæ fuscous; notch in ♂ at 1/5. Abdomen grey. Legs fuscous. Forewings moderate, costa gently arched, apex rounded-rectangular, dorsum slightly oblique; costal fold in ♂ narrow, extending to about middle; fuscous with obscure grey strigulæ and suffusion; numerous fine grey costal strigulæ; an ill-defined grey dorsal suffusion, broadening in middle to extend half across disc, extending to about ¾ dorsum, in one example scarcely indicated; cilia grey with whitish points and an incomplete interrupted fuscous line before middle. Hindwings broad, termen rounded; 3 and 4 stalked; leaden-grey; cilia grey with a sub-basal fuscous line not extending to tornus. Underside of both wings wholly suffused with leaden-grey except for a terminal fuscous band on forewings.

Although otherwise obscure and variable, this species may be recognised by the leaden-grey suffusion of hindwings and underside. Probably this is a secondary sexual character.

Launceston in September; two specimens in the Littler Collection bearing not only a printed locality label but the exact date of capture (25-IX-13). Type in South Australian Museum.

Spilonota argyrotypa, n.sp.

ἀργυροτυπος, silver-marked.

♂. 12 mm. Head, thorax, and abdomen fuscous. Palpi 3; grey. Antennæ fuscous; in ♂ with notch at 1/5, ciliations imperceptible. Legs fuscous. Forewings narrow, not dilated, costa slightly arched, apex subrectangular, termen straight, very slightly oblique; costal fold in ♂ moderate, reaching 1/3, dark ochreous-brown becoming fuscous towards base; three incomplete silvery transverse fasciæ, first from beneath 1/3 costa to mid-dorsum; second above tornus not reaching margins; third from 4/5 costa to termen above tornus; third fascia preceded and followed by a silvery costal dot; cilia silvery-grey, on apex fuscous. Hindwings with termen not sinuate; 3 and 4 stalked; grey; cilia grey.

Cradle Mountain (3,000 ft.) in January; one specimen.

Fam. ELACHISTIDÆ.

Elachista diatoma, n.sp.

διατομος, cut through.

♂. 11 mm. Head and thorax fuscous with brassy reflections and a few whitish scales. Palpi and antennæ fuscous. Abdomen dark-fuscous; tuft grey-whitish. Legs fuscous. Forewings narrow, costa gently arched, apex pointed, termen extremely oblique; fuscous with brassy reflections; a moderately broad white median streak from base to apex; cilia grey, mixed with whitish around apex. Hindwings lanceolate; grey; cilia 4, grey.

Cradle Mountain (3,000 ft.) in January; one specimen.

Coleophora deauratella, Zel.

Meyr. Brit. Lep. p. 646.

♂ ♀. 13-16 mm. Head and thorax brassy-green. Palpi, antennæ, abdomen, and legs fuscous. Forewings lanceolate; brilliant brassy-green, towards apex often brassy-red; cilia brassy-red or brassy-green around apex, on termen and tornus fuscous. Hindwings lanceolate; grey; cilia 5, grey.

A brilliant species quite unlike anything else found in Tasmania. It is now probably found commonly all over the island, and I have received it also from Gisborne, Victoria. Mr. Meyrick kindly identified it for me as without doubt this species, and without doubt also introduced. In his work on British Lepidoptera it is stated that the larva is found on flowerheads of *Trifolium*, living in a case made of part of a floret.

The species could not have been present, or at least not established, in Tasmania when Meyrick collected there in 1882-3, and we have no record of its occurrence before 1925. My Gisborne example is dated 1923. Probably the species was accidentally imported in fodder.

Fam. GELECHIADÆ.

Epiphthora acrocola, n.sp.

ἀκροκολος, shortened at the apex.

♀. 17 mm. Head and thorax whitish-brown. Palpi with second joint long, terminal joint very short (about 1/4); whitish-brown. Antennæ whitish-brown. Abdomen and legs grey. Forewings elongate, costa rather strongly

..ed, apex rather obtuse; whitish, finely and fairly uni-rmly irrorated with grey-brown; cilia brown-whitish with some fuscous irroration opposite apex. Hindwings with emargination rounded-rectangular, apical projection about 1/5; grey; cilia 3, grey.

This species should be recognisable by the very short terminal joint of palpi.

Wilmot in January, one specimen.

Epiphthora hyperænicta, n.sp.

ὑπεραινικτος, very obscure.

♂. 12 mm. Head, antennæ, thorax, abdomen, and legs fuscous. Palpi with second joint moderate, with a small apical inferior tuft, terminal joint about ½; fuscous. Forewings narrow, costa gently arched, apex rounded; pale-grey with fine fuscous irroration; cilia concolorous, on dorsum grey. Hindwings with emargination slight, rectangular, apical projection about 1/5; grey; cilia 3½, grey.

Strahan in February; one specimen.

Aristotelia bacillum, n.sp.

bacillum, a little stick.

♂ ♀. 14-16 mm. Head and thorax fuscous-whitish, more or less pinkish-tinged. Palpi with second joint rough beneath, broadly expanded at apex with rough scales especially above; terminal joint shorter, slender, acute; fuscous; second joint with apical, terminal joint with basal and median whitish rings. Antennæ fuscous. Abdomen grey. Legs fuscous; posterior pair grey-whitish with fuscous tarsal rings. Forewings elongate-oval, costa gently arched, apex rounded; 6 separate; whitish more or less tinged with pink and irrorated with fuscous; sometimes a broad whitish costal streak throughout, and a fuscous median streak, well-defined on costal edge, suffused towards dorsum; in other examples the costal streak may be more or less obliterated by fuscous irroration, and the median streak scarcely developed; stigmata fuscous, not always distinct, first at ⅓ above middle, second on fold beyond first, third in middle of disc towards costa, sometimes a fourth beneath and slightly beyond first; cilia pinkish-grey with blackish irroration on bases, and a blackish apical streak or hook. Hindwings with apex acute, termen strongly sinuate; pale-grey; cilia 1½, pale-grey.

Strahan in February; eight specimens.

Protolechia chionoprora, n.sp.

χιονοπρωρος, with snow-white prow.

♂. 20 mm. Head white. Palpi smooth-scaled; terminal joint longer than second, nearly as stout as second throughout, acute at apex; white, extreme base of second joint fuscous. Antennæ grey, towards base whitish, basal joint white. Thorax white with lateral longitudinal blackish stripes. Abdomen pale-grey, tuft and underside ochreous-whitish. Legs ochreous-whitish; anterior and middle tibiæ and tarsi with fuscous rings. Forewings elongate, costa nearly straight except near base and apex, apex obtusely pointed, termen very oblique; 2 and 3 stalked; whitish-brown partly suffused with fuscous-brown; four oblique dark-fuscous streaks from costa; first at base, very short; second sub-basal; third from 1/3; fourth from middle, prolonged subcostally by a very fine dark-fuscous line to apex; a fine blackish line along fold to middle, with some fuscous suffusion on its dorsal side; a short longitudinal blackish discal streak beyond middle; a subterminal blackish line; cilia ochreous-whitish, bases ochreous-grey. Hindwings with termen sinuate; grey; cilia grey-whitish.

One of the *aversella* group, but immediately distinguished by the peculiar palpi, which may however be found only in the ♂.

Rosebery in February; one specimen (W. B. Barnard).

Protolechia crypsicneca, n.sp.

κρυψικνηκος, with hidden yellow.

♀. 20 mm. Head, thorax, and abdomen fuscous. Palpi fuscous; second joint with white irroration especially on internal surface. Antennæ fuscous. Legs fuscous; tibiæ and tarsi with whitish rings. Forewings narrow, constricted posteriorly, costa moderately arched, apex pointed, termen very oblique; 2 and 3 stalked; fuscous; two white but fuscous-irrorated fasciæ; first from ¼ costa, slightly outwardly oblique, moderately broad, ending abruptly just across fold; second from ¾ costa, broad on costa, narrowing towards tornus, indented near middle posteriorly, its outer edge suffused with pale yellowish; discal dots dark fuscous, first at 1/3 on posterior edge of first fascia, second before 2/3 on anterior edge of second fascia, plical on posterior edge of first fascia slightly beyond first discal; cilia fuscous mixed with whitish, towards tornus grey. Hindwings with termen sinuate; grey; cilia grey.

Cradle Mountain (3,000 ft.) in January; one specimen (W. B. Barnard).

Fam. XYLORYCTIDÆ.

Maroga unipunctana, Don.

Race *tasmanica*. This differs from the typical form in its smaller size (♂ 37 mm., ♀ 54-56 mm.), larger spot on forewings, and fuscous hindwings in both sexes. I do not think it can be regarded as more than a local race.

Fam. ŒCOPHORIDÆ.

Borkhausenia acalles, n.sp.

ἀκαλλης, without charms.

♂. 20 mm. Head, thorax, and abdomen fuscous. Palpi ochreous-whitish irrorated with fuscous. Antennæ fuscous; ciliations in ♂ 1. Legs fuscous; tarsi with ochreous-whitish rings; posterior pair paler. Forewings moderate, posteriorly dilated, costa gently arched, apex rounded, termen obliquely rounded; whitish-ochreous irrorated and suffused with fuscous; markings fuscous; a narrow basal fascia; a discal dot at ⅓, a second in middle, plical before first discal; second discal followed by a pale dot; a very suffused broad fascia from 2/3 costa to tornus; a sinuate subterminal fascia, from 5/6 costa to termen above tornus, broadest beneath costa; a terminal series of dots; cilia whitish-ochreous barred with fuscous. Hindwings and cilia pale grey.

Mount Wellington (2,500 ft.) in January; one specimen (W. B. Barnard).

Leptocroca eucentra, n.sp.

εὔκεντρος, well-pointed.

♂. 18-24 mm. Head white or grey-whitish. Palpi white; external surface of second joint dark fuscous. Antennæ dark grey; ciliations of ♂ very long (6). Thorax white; anterior edge dark fuscous. Abdomen grey; tuft whitish. Legs fuscous; tarsi with fine whitish annulations; posterior pair whitish. Forewings elongate, narrow, costa gently arched, apex acute, termen very oblique; whitish with patchy fuscous suffusion; discal dots blackish; first at ⅓; second beyond middle; plical much before first discal, connected with dorsum by a fuscous suffusion, which sometimes forms an elongate triangular blotch; apical portion of disc more fuscous-suffused; a row of submarginal fuscous dots along apical half of costa and termen to tornus; cilia whitish with an obscure, whitish, interrupted, sub-basal line. Hindwings elongate-ovate; pale-grey; cilia grey-whitish.

Mount Wellington (2,500 ft.), Russell Falls, Lake Fenton (3,500 ft.), Moina (2,000 ft.), and Cradle Mountain (3,000 ft.) in January; abundant in the last-named locality, but I saw only the one sex.

Leptocroca silicolor, n.sp.

silicolor, ochreous.

♂. 23-25 mm. Head whitish-ochreous. Palpi whitish-ochreous irrorated with fuscous. Antennæ fuscous; ciliations in ♂ 1½. Thorax fuscous; apex and apices of shoulder-flaps whitish-ochreous. Abdomen pale-grey; tuft whitish-ochreous. Legs fuscous; tibiæ and tarsi annulated with whitish-ochreous; posterior pair mostly whitish-ochreous. Forewings strongly dilated, costa moderately arched, apex rounded, termen obliquely rounded; whitish-ochreous irrorated with fuscous; a large fuscous spot on base of costa not reaching dorsum; a suffused fuscous blotch on dorsum before middle; discal dots fuscous, minute, and followed by small whitish-ochreous dots; first at ¼, second in middle, plical before first discal; apical part of disc suffused with fuscous; cilia whitish-ochreous, bases irrorated with fuscous. Hindwings broadly ovate; grey; cilia grey.

Mount Wellington (2,500 ft.) in January; two specimens.

Locheutis dolichotricha, n.sp.

δολιχοτριχος, long-haired.

♂. 20 mm. Head whitish-ochreous; face pale fuscous. Palpi fuscous; apex of second joint and a subapical ring on terminal joint whitish-ochreous. Antennæ grey; in ♂ with fascicles of extremely long cilia (10). Thorax brownish-ochreous. Abdomen pale grey. Legs fuscous; tibiæ and tarsi annulated with whitish-ochreous, posterior pair except tarsi whitish-ochreous. Forewings elongate, slightly dilated posteriorly, costa nearly straight, apex round-pointed, termen very obliquely rounded; whitish-ochreous irrorated with fuscous; a dark fuscous dot on base of costa; discal dots dark-fuscous; first at 1/3, second at 2/3, plical beyond first discal; a pale line due to absence of irroration between first and second discal; a terminal series of dark fuscous dots; cilia whitish-ochreous with a few fuscous scales, apices paler. Hindwings and cilia whitish.

Mount Wellington (2,500 ft.) in January; one specimen.

Locheutis inconcinna, n.sp.

inconcinnus, inelegant.

♂. 21 mm. Head and thorax ochreous-whitish mixed with fuscous. Palpi fuscous irrorated with ochreous-whitish, apices of second and terminal joints ochreous-whitish. Antennæ fuscous; ciliations in ♂ 4. Legs fuscous; tarsal rings and posterior pair ochreous-whitish. Forewings narrow, not dilated, costa slightly arched, apex round-pointed, termen very obliquely rounded; ochreous-whitish irrorated throughout with fuscous; markings fuscous; a discal dot at 1/3, a second rather elongate at 2/3, with a whitish dot beneath it, plical beneath first discal; suffused costal spots at 2/3, and before apex, the latter giving rise to an indistinct subterminal line, cilia ochreous-whitish, bases barred with fuscous. Hindwings pale grey; cilia grey-whitish.

Mount Wellington (2,500 ft.) in January; one specimen (W. B. Barnard).

Œnochroa thermistis, Low.

I am not sure that this is more than a form of *O. lætella*, Wlk.

Œnochroa phœnochyta, n.sp.

φοινοχυτος, suffused with red.

♂. 30-32 mm. Head pale red. Palpi pale red; second joint irrorated with dark fuscous externally; terminal joint dark fuscous except apex. Antennæ whitish-ochreous annulated with fuscous, apex of basal joint pale red; ciliations of ♂ 1. Thorax with a large posterior crest; reddish partly fuscous-suffused. Abdomen grey; tuft reddish. Legs dark fuscous; tibiæ and tarsi annulated with pale reddish. Forewings broad, oval-triangular, costa moderately arched, apex rounded, termen obliquely rounded; pale red irrorated with fuscous, which in posterior part of disc tends to form streaks on veins; a blackish dot on base of costa; a suffused, interrupted, fuscous streak on fold; a fine, blackish, longitudinal, median streak from ¼ to middle, succeeded by a blackish spot, from which it is separated by a small reddish or reddish-white spot; a similar spot separates the latter from a short blackish streak running into subterminal line; a curved fuscous subterminal line from 4/5 costa to tornus; cilia pale red mixed with fuscous. Hindwings pale grey; cilia pale grey, on apex reddish-tinged.

The reddish colouring is assimilated to that of the trunks of tree-ferns.

Russell Falls and Moina (2,000 ft.) in January; six specimens.

Trachypepla glebifera, n.sp.

glebiferus, lumpy.

♂. 22 mm. Head and thorax whitish-grey. Palpi ochreous-whitish irrorated with dark fuscous; terminal joint with a dark fuscous subapical ring. Antennæ grey. Abdomen grey-whitish; bases of segments ochreous-grey on dorsum. Legs fuscous; posterior pair mostly ochreous-whitish. Forewings moderate, not dilated, costa gently arched, apex round-pointed, termen obliquely rounded; whitish with patchy fuscous suffusion; large subdorsal transverse crests at ¼ and ¾, pale fuscous; a dark fuscous streak from 1/3 costa to first crest, surrounded by dark fuscous suffusion; uneven dark fuscous suffusion between second crest, termen, and apex, tending to form an interrupted subterminal line and apical spot; cilia fuscous-whitish with dark fuscous points. Hindwings grey; cilia whitish-grey.

Bothwell in February; one specimen (W. B. Barnard).

Gen. Orescoa, nov.

ὀρεσκοος, lurking in the mountains.

Head smooth. Tongue present. Labial palpi rather short, second joint not reaching base of antennæ, terminal joint ¼. Antennæ with pecten not strongly developed, in ♂ moderately ciliated. Thorax smooth. Forewings with 2 and 3 stalked, 7 to apex. Hindwings ovate-lanceolate; neuration normal.

Near *Elæonoma*, Meyr.; differing in the short terminal joint of palpi and form of hindwings.

Orescoa homoconia, n.sp.

ὁμοκονιος, uniformly dusty.

♂ ♀. 18-20 mm. Head pale ochreous. Palpi whitish-ochreous; external surface of second joint except apex fuscous. Antennæ grey; ciliations in ♂ 1. Thorax pale grey. Abdomen grey. Legs fuscous. Forewings narrow, strongly dilated posteriorly, costa gently arched, apex round-pointed, termen very oblique; grey densely and uniformly irrorated with whitish-grey; discal dots fuscous, first discal at ¼, second at about middle, plical before first discal, but the two basal dots may be obsolete; cilia whitish-grey. Hindwings grey; cilia whitish-grey.

Mount Wellington (2,500 ft.), Lake Fenton (3,500 ft.), and Cradle Mountain (3,000 ft.) in January; five specimens.

Barea heterophanes, n.sp.

ἑτεροφανης, of different appearance.

♂ ♀. 22-24 mm. Head whitish; side tufts sometimes fuscous-tinged. Palpi whitish; second joint partly fuscous on outer surface except at apex; terminal joint fuscous at base and apex. Antennæ fuscous; ciliations in ♂ 1. Thorax fuscous; tuft whitish posteriorly. Abdomen grey, sometimes ochreous-tinged. Legs dark-fuscous; tibiæ and tarsi white-ringed; posterior pair except tarsi whitish. Forewings triangular, costa rather strongly arched, apex pointed, termen slightly rounded, oblique; fuscous; some whitish irroration towards margins; discal spots dark-fuscous finely edged with whitish; a dot in disc at 1/3, a larger spot before 2/3, a dot midway between these, an elongate oblique subdorsal mark beneath first, a fifth dot beneath third; a suffused whitish costal spot at ¾, giving rise to a fine outwardly curved whitish line to tornus; a dark fuscous spot on costa between whitish spot and apex; cilia fuscous mixed with whitish. Hindwings and cilia pale-grey.

Mt. Wellington, Russell Falls in January, Rosebery, Zeehan, and Strahan in February; five specimens.

Barea hypselotropha, n.sp.

ὑψηλοτροφος, bred on the heights.

♂. 15-18 mm. Head fuscous. Palpi fuscous; apex of second joint white. Antennæ fuscous; ciliations in ♂ 3. Thorax fuscous with some white scales posteriorly. Abdomen fuscous; under-surface mixed with white. Legs fuscous; tarsi with whitish rings. Forewings rather narrow, not dilated, costa moderately arched, apex rounded, termen obliquely rounded; white with dark fuscous irroration and markings; a short streak from base of costa on fold; a fascia from 1/3 costa to mid-dorsum, sometimes interrupted beyond middle; a second fascia from before 2/3 costa to tornus, interrupted in middle; first discal and plical just beyond first fascia; second discal confluent with upper half of second fascia just above interruption; a white dot just beneath; a subapical blotch with an inwardly projecting tooth in middle; cilia fuscous with a few white scales. Hindwings dark grey; cilia grey.

Cradle Mountain (3,000 ft.) in January; three specimens (W. B. Barnard).

Eulechria ductaria, Meyr.

This is a mountain species. We took a series at Lake Fenton and Cradle Mountain. The locality of the type is given as Hobart, but probably it was taken on Mount Wellington.

Eulechria anomophanes, n.sp.

ἀνομοφανης, of unusual appearance.

♂. 20-22 mm. Head, palpi, and thorax whitish-grey. Antennæ whitish-grey; ciliations in ♂ 1. Abdomen whitish-grey. Legs fuscous; tarsi with whitish annulations; posterior pair whitish. Forewings scarcely dilated, costa gently arched, apex rounded, termen obliquely rounded; white; a rather large, pale grey, basal patch, angled outwards on fold; a broad pale-grey fascia extending on costa from 1/5 to 2/5, on dorsum from ¼ to ¾; a dark fuscous, transverse, short, discal mark at 3/5 interruptedly connected by a short line with tornus; a suffused dark fuscous spot on costa at 2/3, connected by an outwardly curved line with tornus; most of the area between these fuscous markings is occupied by a reddish-brown blotch, which extends over a large area beyond, but is there more greyish; a terminal series of dark fuscous dots; cilia fuscous, bases and apices partly whitish.

Mount Wellington (2,500 ft.) in January; five specimens.

Eulechria sciaphila, n.sp.

σκιαφιλος, shade-loving.

♂. 25-28 mm. Head, palpi, and thorax fuscous with a few whitish scales. Antennæ fuscous; ciliations in ♂ 1½. Abdomen fuscous. Legs fuscous; posterior tibiæ grey-whitish. Forewings elongate, not dilated, costa gently arched near base, thence straight, apex rounded, termen very obliquely rounded; fuscous uniformly irrorated with whitish; discal dots fuscous, first at ¼, second beyond middle, plical beneath first discal; cilia fuscous with a few whitish scales. Hindwings and cilia grey.

Lake Fenton (3,500 ft.) in January; two specimens (W. B. Barnard).

Eulechria oxypeuces, n.sp.

ὀξυπευκης, sharp pointed.

♂. 24 mm. Head white; side-tufts mixed with grey. Palpi fuscous; apex of second joint white. Antennæ grey, towards base whitish; ciliations of ♂ 2½. Thorax white irrorated with grey. Abdomen grey-whitish; on dorsum barred with brownish-ochreous. Legs fuscous; [posterior pair missing]. Forewings narrowly elongate, costa gently arched, apex acute, termen extremely oblique; white partly suffused with pale grey; discal dots large, grey, first discal and plical confluent forming a large, elongate, inwardly oblique spot from beneath 1/3 costa, crossing fold; second

discal beneath 2/3 costa, with a suffused spot between it and lower part of termen; a broad grey suffusion along costa from 1/3 to apex; a terminal series of grey dots; cilia pale grey. Hindwings and cilia pale grey.

Bothwell in February; one specimen (W. B. Barnard).

Eulechria sthenopis, n.sp.

σθενωπις, strongly built.

♂. 26-28 mm. Head whitish. Palpi fuscous; apex of second and base of terminal joint whitish. Antennæ grey; ciliations in ♂ 2/3. Thorax whitish irrorated with fuscous. Abdomen grey. Legs fuscous; tarsal rings and posterior pair ochreous-whitish. Forewings rather broad, slightly dilated posteriorly, costa gently arched, apex rounded, termen obliquely rounded; whitish with some fuscous irroration; markings fuscous; a basal costal spot sometimes extending to dorsum; a broad, outwardly oblique bar from 1/5 costa, gradually narrowing to its apex on fold; a discal dot at 1/3, another beneath it on fold, a third above middle, and three arranged in a transverse crescent at 2/3; rarely a slight ochreous suffusion around plical and posterior discal dots; a rather large, triangular, suffused spot on mid-costa; another at ¾, from which proceeds a subterminal line, strongly curved outwards, ending on tornus; a terminal series of interneural dots, sometimes prolonged into disc as short streaks; cilia grey, bases fuscous barred with whitish. Hindwings pale grey; cilia whitish with a pale grey basal line.

Cradle Mountain (3,000 ft.) in January; ten specimens all of the one sex.

Eulechria cirrhopis, n.sp.

κιρρωπις, yellowish.

♀. 18 mm. Head and thorax pale ochreous. Palpi short, second joint not reaching base of antennæ, terminal joint ½; pale ochreous. Antennæ pale ochreous with blackish annulations. Abdomen grey; barred on dorsum with brownish-ochreous. Legs pale ochreous; anterior and middle tibiæ and tarsi fuscous except on apices of segments. Forewings moderate, not dilated, costa slightly arched, apex round-pointed, termen very oblique; pale ochreous with a few scattered fuscous scales; discal dots dark fuscous, first at 2/5, second at 3/5, plical before first discal; cilia pale ochreous. Hindwings pale grey; cilia ochreous-whitish with a pale grey sub-basal line.

Russell Falls in January; two specimens.

Eulechria tacita, n.sp.

tacitus, quiet.

♂ ♀. 13-14 mm. Head and palpi fuscous with slight whitish irroration. Antennæ fuscous; ciliations in ♂ 2½. Thorax, abdomen, and legs fuscous. Forewings narrow, not dilated, costa slightly arched, apex round-pointed, termen nearly straight, oblique; fuscous irrorated with whitish, especially in central part of disc; discal dots dark fuscous, first beyond 1/3, second at 2/3, plical well before first discal; cilia fuscous, apices paler. Hindwings and cilia fuscous.

Zeehan and Strahan in February; two specimens.

Eulechria psathyropa, n.sp.

ψαθυρωπος, of fragile appearance.

♀. 19 mm. Head and palpi pale fuscous-brown. Antennæ and thorax fuscous. Abdomen fuscous; on dorsal broadly brown behind middle. Legs fuscous; tarsal rings and most of posterior tibiæ ochreous-whitish. Forewings narrow, strongly dilated posteriorly, costa gently arched, apex round-pointed, termen nearly straight, oblique; whitish with general fuscous irroration, but less in central part of disc; markings fuscous; first discal at 1/3, second before 2/3, a third between and above these, plical before first discal; a costal spot at 5/6 giving rise to a strongly outwardly curved line to tornus; cilia whitish, on apex fuscous. Hindwings and cilia pale grey.

Cradle Mountain (3,000 ft.) in January; one specimen.

Tisobarica phæopyra, n.sp.

φαιοπυρος, dark, but fiery.

♂. 14 mm. Head and thorax brassy-fuscous. Palpi rather short, second joint not reaching base of antennæ, terminal joint ½; fuscous. Antennæ dark fuscous; ciliations in ♂ extremely long (8). Abdomen and legs dark fuscous Forewings narrow-oblong, costa straight; apex round-pointed, termen straight, moderately oblique; fuscous; markings dark fuscous with brassy and purple-metallic reflections; a basal patch; a costal streak to 2/3; a broad oblique fascia from 1/3 costa ending in a rounded apex before reaching mid-dorsum; a circular blotch in disc at 2/3, confluent with costal streak; a terminal suffusion; a clear yellow elongate dot on fold; cilia fuscous. Hindwings and cilia fuscous.

Differs from others of the genus by its shorter palpi, longer antennal ciliations, and general *facies*, but it seems best to refer it here.

Mount Wellington (2,500 ft.) in January; one specimen.

Machimia pastea, n.sp.

παστεος, besprinkled.

♂. 22 mm. ♀. 27 mm. Head, palpi, and thorax pale ochreous-grey in ♂, purplish-grey in ♀. Antennæ grey; ciliations in ♂ 1. Abdomen pale grey, in ♀ with a large brownish-ochreous spot on dorsum of each segment. Legs ochreous-whitish; anterior pair fuscous; anterior tarsi with ochreous-whitish annulations. Forewings dilated posteriorly, costa moderately arched, apex rounded in ♂, round-pointed in ♀, termen obliquely rounded; 7 to apex; pale ochreous-grey in ♂, purplish-grey in ♀, with scanty blackish irroration; markings blackish; a discal dot at 1/3, a second before 2/3, plical slightly beyond first discal; a submarginal series of dots along apical third of costa and whole of termen; cilia concolorous. Hindwings whitish with a few fuscous scales towards termen; cilia whitish.

Russell Falls in January; two specimens.

Machimia brachytricha, n.sp.

βραχυτριχος, short-haired.

♂. 32-34 mm. Head and thorax pale rosy. Palpi whitish tinged with rosy; terminal joint partly fuscous anteriorly. Antennæ grey, towards base rosy annulated with grey; ciliations in ♂ extremely short (¼). Abdomen brownish-grey. Legs ochreous-whitish; anterior pair rosy. Forewings suboblong, only slightly dilated, costa strongly arched, apex subrectangular, termen slightly oblique, rounded beneath; 7 to termen; rosy; markings fuscous; a discal dot beyond ¼, a second beyond middle, plical slightly beyond first discal; a very fine, sometimes obsolete, line from beneath midcosta obliquely outwards to ¾, there bent at a right angle, and curved to dorsum slightly before tornus; sometimes a terminal series of dots; cilia rosy. Hindwings whitish; towards apex and termen suffused with grey; cilia grey whitish.

Easily recognised by the extremely short antennal ciliations, but otherwise a perfectly normal species of the genus.

Lake Fenton (3,500 ft.) and Cradle Mountain (3,000 ft.) in January; eight specimens.

Euprionocera hypertricha, n.sp.

ὑπερτριχος, extremely hairy.

♂. 25 mm. Head ochreous-grey. Palpi grey; inner surface ochreous-whitish. Antennæ fuscous; ciliations in ♂ extremely long (10). Thorax ochreous-grey. Abdomen grey. Legs ochreous; anterior pair and middle femora

fuscous. Forewings suboblong, costa strongly arched to middle, thence straight, apex rectangular, termen straight, not oblique, but obliquely rounded towards tornus; grey suffused and irrorated with ochreous; five ochreous-whitish small costal spots from ¼ to near apex, each followed by a fuscous dot; cilia ochreous mixed with grey, apices whitish. Hindwings broader than forewings; whitish; apical third, terminal, and dorsal margins dark grey; cilia whitish, bases dark grey.

Mount Wellington (3,500 ft.) in January; one specimen.

Ocystola polyphila, n.sp.

πολυφιλος, much esteemed.

♀. 21 mm. Head brown. Palpi whitish with fuscous irroration; terminal joint fuscous. Antennæ fuscous. Thorax fuscous-brown; shoulder-flaps yellow. [Abdomen missing.] Legs whitish irrorated with fuscous. Forewings elongate, not dilated, costa gently arched, apex round-pointed, termen nearly straight, oblique; rather deep yellow; costal edge rosy as far as middle; a rather large, triangular, fuscous spot on dorsum from middle to tornus; cilia yellow, rosy-tinged, on tornus narrowly fuscous. Hindwings grey; cilia pale grey.

Cradle Mountain (3,000 ft.) in January; one specimen.

Cæsyra plectanora, n.sp.

πλεκτανορος, wearing a wreath.

♀. 22 mm. Head whitish. Palpi whitish with slight fuscous irroration. Antennæ and thorax fuscous. Abdomen brownish-fuscous. Legs fuscous; posterior pair grey, whitish on dorsum. Forewings moderate, slightly dilated, costa gently arched, apex pointed, termen nearly straight, strongly oblique; fuscous with white markings; a strongly curved, semicircular fascia from near base of costa to 1/5 dorsum; an inwardly oblique fascia from 2/3 costa towards ¾ dorsum, constricted above middle, not reaching dorsum; a narrow fascia from 5/6 costa to termen below middle, angled inwards beneath costa; cilia fuscous. Hindwings and cilia grey.

Mount Wellington (2,500 ft.) in January; one specimen (W. B. Barnard).

Cæsyra ochrocirrha, n.sp.

ὠχροκιρρος, pale yellowish.

♂ ♀. 19-20 mm. Head and thorax pale yellowish. Palpi pale yellowish; second joint partly dark fuscous ex-

ternally. Antennæ grey; ciliations in ♂ 3. Legs fuscous; tibiæ and tarsi annulated with whitish-ochreous; posterior pair mostly whitish-ochreous. Forewings suboval, dilated somewhat posteriorly, costa moderately arched, apex round-pointed, termen very obliquely rounded; pale yellowish, sometimes with some grey suffusion; discal dots grey, first at 1/3, second before 2/3, plical before first discal; cilia pale yellowish, sometimes partly grey. Hindwings and cilia pale grey.

Cradle Mountain (3,000 ft.) in January; seven specimens.

Pleurota chlorochyta, Meyr.

I think *P. perisema*, Low., is a synonym of this species.

Pleurota tritosticta, n.sp.

τριτοστικτος, three-spotted.

♂. 20-25 mm. Head, palpi, thorax, abdomen, and legs fuscous. Antennæ fuscous; ciliations in ♂ 1. Forewings elongate, scarcely dilated, costa gently arched, apex pointed, termen nearly straight, strongly oblique; fuscous; discal dots blackish, very distinct, first at 1/3, second before 2/3, third on fold before first, elongate; cilia fuscous. Hindwings and cilia pale grey.

Larger than *P. psephena*, from which it is readily distinguished by the plical dot being considerably before first discal.

Lake Fenton (3,500 ft.) in January; three specimens.

Pleurota titanitis, n.sp.

τιτανιτις, chalky.

♀. 22 mm. Head and thorax whitish. Palpi whitish; external surface of second and terminal joints fuscous except at base and apex. Antennæ and abdomen grey. Legs fuscous; posterior pair whitish. Forewings rather narrow, not dilated, costa gently arched, apex pointed, termen very oblique; whitish with some grey irroration towards margins; a rather broad, even, grey, dorsal streak throughout; discal dots blackish, first at 1/3, second before 2/3, plical elongate, well before first discal; a suffused fuscous apical spot; cilia whitish. Hindwings grey-whitish; cilia whitish.

Cradle Mountain (3,000 ft.) in January; one specimen (W. B. Barnard).

Atheropla fumosa, n.sp.

fumosus, smoky.

♂. 15-18 mm. Head fuscous; side-tufts ochreous. Palpi ochreous; outer surface of second joint, except apex, and

apex of terminal joint dark fuscous. Antennæ fuscous, basal joint ochreous; ciliations in ♂ 6. Thorax dark fuscous; anterior margin and shoulder-flaps ochreous. Legs dark fuscous; anterior and middle tarsi mostly ochreous; posterior tibiæ and tarsi grey. Forewings rather narrow, slightly dilated posteriorly, costa very slightly arched, apex pointed, termen slightly rounded, strongly oblique; fuscous; a broad ochreous costal streak gradually narrowing to 5/6; discal dots rather large, dark fuscous, first at ⅓, second about middle, plical beneath first discal, the latter two each followed by an ochreous dot; three or four ochreous terminal dots; cilia fuscous. Hindwings and cilia fuscous.

Mount Wellington (3,500 ft.) and Lake Fenton (3,500 ft.) in January; nine specimens.

Enchronista bathrosticha, n.sp.

βαθροστιχος, with basal line.

♂ ♀. 25-28 mm. Head ochreous-whitish. Palpi ochreous-whitish; second joint fuscous at base, and slightly so before apex. Antennæ grey, near base fuscous; ciliations in ♂ 3. Thorax ochreous-whitish, sometimes fuscous anteriorly. Abdomen pale grey. Legs fuscous; tibiæ and tarsi with ochreous-whitish annulations; posterior pair ochreous-whitish. Forewings dilated posteriorly, costa rather strongly arched, apex pointed, termen nearly straight, oblique; ochreous-whitish with dark fuscous markings and scanty irroration; a conspicuous line from base of costa along fold to 1/5; a discal dot at ⅓, another at ⅔, two smaller dots transversely placed between these; suffused costal spots at 2/3 and before apex, sometimes suffusedly produced into disc; a terminal series of dots; cilia ochreous-whitish. Hindwings and cilia grey-whitish.

Not unlike some species of *Chezala*, but I find no trace of an antennal pecten.

Russell Falls and Cradle Mountain (3,000 ft.) in January; three specimens.

Chezala liopa, n.sp.

λειωπος, smooth.

♂. 24 mm. Head and thorax whitish-ochreous. Palpi whitish-ochreous; base of second joint fuscous. Antennæ grey; ciliations in ♂ 1½. Abdomen ochreous-whitish. Legs fuscous; tibiæ and tarsi with whitish-ochreous rings; posterior pair mostly whitish-ochreous. Forewings whitish-ochreous with a few fuscous scales; markings fuscous; costal edge fuscous to about middle; a basal costal dot; first discal

at $\frac{1}{4}$, second larger and transversely elongate beyond middle, an additional dot above and between these, plical slightly before first discal; cilia whitish-ochreous. Hindwings grey-whitish; cilia whitish.

Cradle Mountain (3,000 ft.) in January; one specimen (W. B. Barnard).

Gen. ORESITROPHA, nov.

ὀρεσιτροφος, mountain-bred.

Palpi very long; second joint more than twice length of face; terminal joint $\frac{1}{2}$, rather stout. Antennæ with pecten weakly developed; in ♂ with moderate ciliations. Forewings with 2 from 4/5, 3 from shortly before angle, 7 to termen, 11 from middle of cell. Hindwings normal.

Differs from *Tanyzancla*, Meyr., in the shorter and stouter terminal joint of palpi, from *Delonoma*, Meyr., in 3 and 4 of forewings being well separate.

Oresitropha melanotypa, n.sp.

μελανοτυπος, black-marked.

♂. 24 mm. Head pale ochreous. Palpi pale ochreous; bases of second and terminal joints and some irroration dark fuscous. Antennæ pale ochreous annulated with blackish; ciliations in ♂ 1. Thorax pale ochreous; shoulder flaps fuscous. Abdomen grey. Legs fuscous; tibiæ and tarsi ringed with pale ochreous; posterior pair mostly pale ochreous. Forewings elongate, narrow, strongly dilated posteriorly, costa slightly arched, apex rounded, termen very obliquely rounded; pale ochreous with scanty blackish irroration, especially towards costa; markings blackish; a broad, irregularly outlined, median bar from 1/5 to middle, slightly expanded at anterior end, deflected towards costa posteriorly, and giving off two or three fine streaks along veins; a large costal spot at 5/6 from which proceeds a sinuate line to tornus; cilia whitish-ochreous. Hindwings grey; cilia whitish, bases grey.

Cradle Mountain (3,000 ft.) in January; one specimen (W. B. Barnard).

Philobota phœnopasta, n.sp.

φοινοπαστος, sprinkled with red.

♂ ♀. 24-29 mm. Head grey. Palpi fuscous. Antennæ fuscous; ciliations in ♂ 4. Thorax grey mixed with ferruginous-red. Abdomen grey partly mixed with ferruginous on dorsum. Legs fuscous. Forewings moderate, not dilated, costa gently arched, apex round-pointed, termen

nearly straight, oblique; grey densely irrorated, except on margins, with ferruginous-red, which sometimes tends to form longitudinal streaks; a suffused whitish discal spot at 3/5; cilia grey with a few ferruginous scales. Hindwings and cilia grey.

Mount Wellington (4,000 ft.), and Lake Fenton (3,500 ft.) in January; six specimens.

Philobota rasilis, n.sp.

rasilis, smooth.

♂. 24 mm. Head ochreous-whitish. Palpi pale fuscous; apex and posterior surface of second joint ochreous-whitish. Antennæ grey; ciliations in ♂ 1½. Thorax whitish-grey. Abdomen and legs grey. Forewings moderate, scarcely dilated, costa slightly arched, apex pointed, termen slightly sinuate, oblique; whitish-grey; discal dots fuscous, the two basal minute or obsolete, first discal before 1/3, second before 2/3, plical shortly before first discal; cilia whitish-grey. Hindwings and cilia grey.

Hobart in January; two specimens (W. B. Barnard).

Philobota lissopolia, n.sp.

λισσοπολιος, smooth grey.

♂ ♀. 22-24 mm. Head, palpi, thorax, and abdomen pale grey. Antennæ pale grey; ciliations in ♂ 2. Legs grey; posterior pair whitish. Forewings moderate, dilated posteriorly, costa rather strongly arched, apex rounded-rectangular, termen rounded, slightly oblique; pale grey; markings fuscous; a discal dot at 1/3, a second before 2/3, plical beyond first discal; a submarginal series of dots from beneath 2/3 costa to tornus; cilia pale grey. Hindwings and cilia whitish-grey.

Not unlike *P. ethnitis*, Meyr., but the antennal ciliations are much shorter.

Rosebery in February; three specimens.

Philobota placochorda, n.sp.

πλακοχορδος, broad-striped.

♂. 26-30 mm. Head white. Palpi white; second joint except apex fuscous on external surface. Antennæ grey, towards base whitish; ciliations of ♂ 4. Thorax dark fuscous. Abdomen dark grey. Legs fuscous; posterior pair whitish-grey. Forewings elongate, not dilated, costa straight, slightly arched towards base and apex, apex pointed, termen nearly straight, oblique; dark fuscous; a very broad white streak from base to 4/5 costa, giving rise to two processes near its distal end reaching tornus, where they some-

times fuse; a dark fuscous discal spot at 2/5, and another at 3/5; a terminal series of white dots; cilia fuscous. Hindwings and cilia dark grey.

Nearest *P. anachorda*, Meyr.

Bothwell in February and March; two specimens (W. B. Barnard).

Philobota hyphanta, n.sp.

ὑφαντος, interwoven.

♂. 21 mm. Head white. Palpi whitish; external surface of second joint except apex dark fuscous. Antennæ dark fuscous; ciliations in ♂ 5. Thorax white mixed with dark fuscous. Abdomen fuscous. Legs fuscous; tarsi white-ringed; posterior pair except tarsi mostly whitish. Forewings not dilated, costa gently arched, apex pointed, termen nearly straight, strongly oblique; white, but mostly overlaid with dark fuscous markings; an elongate basal costal spot; a similar spot on 1/3 costa, more or less confluent with a discal spot at 1/3, and this with a large dorsal suffusion extending on dorsum from near base to near tornus, and including an irregular white area above dorsum; two confluent discal spots at 2/3, more or less connected with a large apical blotch extending from 3/5 costa to tornus; cilia dark fuscous, apices partly whitish. Hindwings and cilia dark grey.

Nearest *P. niphias*, Meyr.

Lake Fenton (3,500 ft.) in January; one specimen.

Philobota poliocneca, n.sp.

πολιοκνηκος, yellowish grey.

♀. 22 mm. Head whitish. Palpi grey; terminal joint fuscous, towards base whitish. Antennæ fuscous. Thorax, abdomen, and legs grey. Forewings moderate, not dilated, costa gently arched, apex round-pointed, termen obliquely rounded; grey generally suffused with pale ochreous; cilia grey. Hindwings and cilia pale grey.

Cradle Mountain (3,000 ft.) in January; one specimen (W. B. Barnard).

Philobota micranepsia, n.sp.

μικρανεψιος, a small cousin.

♂. 14-20 mm. Head and thorax fuscous. Palpi fuscous; apex of second joint narrowly whitish. Antennæ fuscous; ciliations in ♂ 2½. Abdomen and legs fuscous. Forewings somewhat dilated posteriorly, costa gently arched, apex acute, termen very obliquely rounded; brownish-fuscous; discal dots minute, dark-fuscous, first at 2/5, second

at 3/5, plical beneath first discal; sometimes indications of a dark-fuscous, subterminal line; cilia brownish-fuscous. Hindwings and cilia dark grey.

Lake Fenton (3,500 ft.) and Cradle Mountain (3,000 ft.) in January; nine specimens.

Eochrois cirrhophara, n.sp.

κιῤῥοφαρος, in yellowish robe.

♂ ♀. 18-20 mm. Head, palpi, and thorax ochreous tinged with grey. Antennæ white finely annulated with blackish; ciliations in ♂ 2. Abdomen grey. Legs fuscous; posterior pair whitish-ochreous. Forewings elongate-triangular, costa gently arched, apex pointed, termen sinuate, oblique; ochreous tinged with grey; in ♂ without markings; in ♀ with faint rosy discal dots, first at 1/3, second at 2/3, plical beneath first discal, and a faint rosy elongate subterminal suffused spot from tornus; cilia grey, apices whitish. Hindwings with termen slightly sinuate; grey; cilia grey.

Rosebery, Zeehan, and Strahan in February; ten ♂ and one ♀ specimens.

Thudaca innubila, n.sp.

innubilus, unclouded.

♂. 20-22 mm. Head and thorax grey-whitish. Palpi long, second joint three times length of face, terminal joint 1/3; whitish. Antennæ whitish. Abdomen and legs whitish. Forewings narrow-oval, costa moderately arched, apex acute, termen very obliquely rounded; white; cilia white. Hindwings and cilia white.

Rosebery, Zeehan, and Strahan in February; thirteen specimens.

Cryptolechia lutea, n.sp.

luteus, yellow.

♂. 21-22 mm. Head orange-yellow. Palpi yellowish; second joint with a broad dark fuscous ring before apex. Antennæ grey-whitish, towards base ringed with blackish. Thorax orange yellow with a fuscous dot on each shoulder. Abdomen grey-whitish; apical segments and tuft ochreous-yellow. Legs whitish-ochreous; anterior tibiæ, anterior and middle tarsi with dark-fuscous rings. Forewings oval, costa strongly arched towards base, gently towards apex, apex rounded, termen obliquely rounded; orange-yellow; a short blackish costal streak from base; a blackish dot on costa at middle, and another in disc at 3/5; cilia ochreous-yellow. Hindwings and cilia whitish-ochreous.

Rosebery in February; eight specimens.

Cryptolechia argillea, n.sp.

ἀργίλλεος, clay-coloured.

♂. 20 mm. Head pale brown. Palpi dark fuscous; apex and base of second joint whitish. Antennæ grey, towards base ringed with blackish. Thorax brownish with a fuscous spot on each shoulder. Abdomen pale grey; tuft whitish-ochreous. Legs ochreous-whitish; anterior pair mostly dark-fuscous; anterior and middle tarsi with dark fuscous rings. Forewings oval, costa strongly arched towards base, gently towards apex, apex rounded, termen obliquely rounded; pale brown; a costal streak to ¼, and a costal dot at 3/5, fuscous; cilia pale brown. Hindwings and cilia pale grey.

Closely allied to the preceding, of which it might possibly be an aberration, but differing much in colour, and without discal dot.

Rosebery in February; one specimen.

Cryptolechia illepida, n.sp.

illepidus, inelegant.

♂. 18-20 mm. Head, palpi, antennæ, and thorax fuscous. Abdomen grey. Legs fuscous; tarsal rings and most of posterior pair whitish. Forewings narrow, slightly dilated posteriorly, costa gently arched, apex rounded, termen very obliquely rounded; fuscous; discal dots slightly darker, first at 1/3, second slightly beyond middle, plical before first discal; cilia fuscous, apices paler. Hindwings and cilia grey.

Russell Falls in January; two specimens.

Fam. HELIODINIDÆ.

Gen. LEUROSCELIS, nov.

λευροσκελις, smooth-legged.

Tongue present. Labial palpi moderately long, ascending, curved, smooth, acute; terminal joint as long as second. Maxillary palpi obsolete. Posterior tibiæ smooth with short terminal whorl of scales; posterior tarsi with very short terminal whorls on each joint. Forewings with 6 and 7 long-stalked, 7 to costa, 8 absent. Hindwings with all veins present and separate.

Leuroscelis coracopis, n.sp.

κορακωπις, black as a crow.

♀. 12 mm. Head and palpi blackish. Antennæ blackish; from 3/5 to 4/5 white. Thorax blackish; anterior

margin grey. Abdomen blackish; under-surface whitish. Legs blackish; femora whitish. Forewings narrow, costa straight, apex obtusely pointed; blackish; an obscure suffused grey-whitish spot on tornus; cilia blackish; on extreme apex grey-whitish. Hindwings lanceolate; dark-fuscous; cilia 3. dark-fuscous.

Moina (2,000 ft.), Cradle Mountain Road, in January; one specimen.

Fam. GLYPHIPTERYGIDÆ.

Gen. CYLICOPHORA, nov.

κυλικοφορος, cup-bearing.

Head with appressed scales. Tongue and maxillary palpi obsolete. Labial palpi rather short, porrect or somewhat ascending, not reaching antennæ; second joint thickened with rough scales anteriorly; terminal joint very short, acute. Antennæ with basal joint thickened in front by a strong expansion of scales and flattened beneath to form an eyecap; in ♂ with extremely long pectinations, longest about middle (10), much shorter before apex. Thorax not crested. Posterior tibiæ smooth-scaled. Forewings with all veins present, 2 from near angle, 7 separate, to termen, 8 and 9 stalked, 8 to apex, 11 from 2/3. Hindwings with all veins present, 2 from 4/5, 3 and 4 approximated at origin, 5, 6, 7 separate, parallel.

A peculiar genus with extraordinary antennal structure.

Cylicophora collina, n.sp.

collinus, of the hills.

♂. 14-16 mm. Head ochreous-whitish. Palpi fuscous. Antennæ whitish; pectinations fuscous. Thorax and abdomen fuscous. Legs fuscous; posterior pair grey; terminal joints of middle and posterior tarsi whitish. Forewings moderate, not dilated, costa moderately arched, apex round-pointed, termen obliquely rounded; fuscous with variably developed white transverse strigulæ; these combine to form two fasciæ; first antemedian, moderately broad, outwardly curved, its outer edge angled above middle; second illdefined broad on costa from middle to $\frac{3}{4}$, narrowing to a point at tornus; some irregular ochreous irroration; two dark fuscous discal dots in fasciæ, first beyond 1/3, second at 2/3; some ochreous-whitish terminal dots; cilia fuscous. Hindwings and cilia fuscous.

Cradle Mountain (3,000 ft.) in January; one specimen (W. B. Barnard).

Glyphipteryx haplographa, n.sp.

ἁπλογραφος, simply marked.

♂. 10 mm. Head and thorax dark-fuscous; face whitish. Palpi slightly rough-scaled beneath; whitish without dark rings, apex fuscous. Antennæ fuscous. Abdomen dark-fuscous; extreme base and apex narrowly whitish. Legs dark-fuscous; whitish tibial rings very slender. Forewings narrow, costa slightly sinuate, apex rounded, termen nearly straight, oblique; 7 and 8 separate; blackish; two slender white transverse fasciæ, first at 1/3, second at 2/3; a white costal dot before apex, partly in cilia; cilia blackish, apical half white except on apex and above tornus, wholly white on tornal end of second fascia. Hindwings narrow-lanceolate; grey; cilia 3, grey.

Not near any other species so far as I know.

Zeehan in February; one specimen (G. H. Hardy).

Glyphipteryx leucargyra, n.sp.

λευκαργυρος, silvery-white.

♂ ♀. 16-18 mm. Head whitish; face grey. Palpi with very long rough hairs beneath; white with four fuscous rings. Antennæ fuscous. Thorax whitish with grey sides. Abdomen grey with whitish rings on apices of segments. Legs fuscous; posterior tibiæ and all tarsi ringed with white. Forewings moderate, costa gently arched, apex rounded, termen nearly straight oblique; 7 and 8 separate; pale ochreous-grey; markings shining silvery-white; two short, broad, very oblique dorsal streaks; first from base to fold; second from middle just crossing fold; seven fine costal streaks partly edged with dark-fuscous; first from ¼, strongly outwardly-oblique, reaching about half across wing; second short; third from middle of costa to tornus, interrupted in mid-disc, before the interruption is a white spot; fourth sinuate reaching 2/3 across disc; fifth and sixth very short; seventh reaching to terminal incision; a streak from tornus towards but not reaching sixth costal streak; often some fuscous suffusion in posterior part of disc, but no defined markings; cilia with basal half ochreous-grey, apical half white, divided by a blackish line, which is interrupted above midtermen, a dark-fuscous apical hook. Hindwings broadly lanceolate; grey; cilia ¾, grey.

Cradle Mountain (3,000 ft.) in January, Rosebery in February, Zeehan in January; five specimens (W. B. Barnard and G. H. Hardy).

Glyphipteryx gypsonota, n.sp.

γυψονωτος, with chalk-white back.

♂. 16-18 mm. Head whitish. Palpi with very long rough hairs beneath; white with four blackish rings. Antennæ fuscous. Thorax white; shoulder-flaps ochreous-grey. Abdomen grey; apex of tuft whitish. Legs fuscous; tarsi with white rings; anterior coxæ and posterior tibiæ except a subapical band white. Forewings moderate, posteriorly dilated, costa gently arched, apex rounded, termen nearly straight, oblique; 7 and 8 separate; ochreous-grey with a suffused white streak along dorsum; markings silvery-white narrow streaks partly edged with blackish scales; seven costal streaks; first from ¼ costa obliquely outwards, becoming longitudinal in middle of disc, then bent at a rounded right angle, ending on dorsum before tornus; second short; third and fourth reaching half across disc; third nearly touching first at angle; fifth and sixth short; seventh ending in terminal incision; an outwardly oblique sinuate streak from tornus towards, but not reaching, sixth costal streak; cilia with basal half ochreous-grey, apical half white, divided by a blackish line above middle of termen, a blackish apical hook. Hindwings ovate-lanceolate; grey; cilia 2/3, grey.

Rosebery in February; six specimens (W. B. Barnard).

Fam. HYPONOMEUTIDÆ.

Gen. Pauroneura, nov.

παυρονευρος, with few veins.

Head with side tufts smooth, but with rough projecting hairs anteriorly between antennæ; face shortly rough-scaled. Tongue present but weak. Maxillary palpi obsolete. Labial palpi moderately long, drooping, smooth. Antennæ nearly as long as forewings; basal joint much enlarged with rough scales, which form a dense pecten beneath; in ♂ simple. Posterior tibiæ with long hairs, smoothly appressed on dorsum, but forming a long spreading apical tuft extending half the length of tarsi; beneath with long spreading hairs. Forewings with 4 absent, 7 and 8 stalked, 7 to costa, 11 from before middle. Hindwings ovate-lanceolate, cell ½, costal margin weak or obsolete, 3, 4, and 5 absent, 6 and 7 connate.

Very peculiar in the much reduced venation of hindwings, specialised also in the structure of the head and bases of antennæ. I find it difficult to place this genus, but think it goes best here. It is possibly remotely allied to *Thereutis*, Meyr.

Pauroneura acrospila, n.sp.

ἀκρόσπιλος, with apical spot.

♂. 18 mm. Head, antennæ, thorax, abdomen, and legs dark-fuscous. Palpi whitish. Forewings broadly lanceolate; dark-fuscous; a small white apical spot; cilia fuscous. Hindwings ovate-lanceolate; fuscous; cilia 1, fuscous.

Lake Fenton (3,500 ft.), National Park, in January; one specimen.

Charicrita othonina, n.sp.

ὀθόνινος, made of linen.

♂. 14 mm. Head, palpi, and thorax ochreous-whitish. Antennæ grey-whitish. Abdomen whitish. Legs grey; posterior pair whitish. Forewings rather narrow, not dilated, costa gently arched, apex pointed, termen sinuate, strongly oblique; ochreous-whitish; two or three minute blackish dots on basal fourth of costa, and four or five on dorsum; a blackish dot in disc at 2/3 beneath middle; cilia ochreous-whitish. Hindwings ovate-lanceolate; whitish; cilia whitish.

Strahan in February; one specimen.

Fam. GRACILARIADÆ.

Cyphostica zophonota, n.sp.

ζοφόνωτος, dusky-backed.

♂. 20 mm. Head and thorax fuscous-brown. Palpi anteriorly dark-fuscous, posteriorly brownish becoming whitish towards base. Antennæ fuscous. Abdomen fuscous. Legs fuscous; middle tibiæ thickened with median and terminal tufts of scales. Forewings narrow, elongate; ochreous-white; a narrow fuscous-brown costal streak to ¾; a broad dorsal streak extending to fold, gradually narrowing to tornus, fuscous-brown; terminal part of disc suffused with brown, in it an outwardly-oblique blackish streak containing a few white scales; cilia fuscous-brown, on tornus and dorsum grey. Hindwings lanceolate; grey; cilia 3, grey.

Cradle Mountain (3,000 ft.) in January; one specimen. This species together with *C. ostracodes* was taken by beating *Fagus cunninghami* into an umbrella on a cold rainy day.

Fam. AMPHITHERIDÆ.

Gen. Chalcoteuches, nov.

χαλκοτευχής, in brazen armour.

Head densely rough-haired; face smooth. Tongue present. Labial palpi long, slender, smooth-scaled ascending,

recurved; terminal joint as long as second, acute. Maxillary palpi obsolete. Antennæ longer than forewings (1¼); in ♂ simple. Eyes normal. Posterior tibiæ smooth above, beneath shortly rough-scaled between spurs. Forewings with 2 from shortly before angle, 7 and 8 stalked, 7 to costa, anal veins forming a long basal U loop. Hindwings much broader than forewings, termen sinuate; 2 from 4/5, 3 and 4 stalked, 5, 6, 7 widely separate, equidistant parallel.

Chalcoteuches phlogera, n.sp.

φλογερος, blazing.

♂. 12-14 mm. Head pale-brown; face ochreous-silvery. Palpi fuscous; internal surface whitish. Antennæ fuscous. Thorax shining purple-coppery or green-coppery. Abdomen and legs fuscous. Forewings broadly lanceolate; brilliantly metallic coppery, green, purple, and red, variously mixed; cilia fuscous, apices whitish beneath apex of wing. Hindwings about twice as broad as forewings, termen slightly sinuate; fuscous; cilia fuscous.

♀. 14-16 mm. Similar; but forewings with four white spots; two median at 1/3 and 2/3, the latter transversely elongate; a subdorsal spot at ¼, sometimes extending to margin, and a second dorsal spot at ¾.

Cradle Mountain (3,000 ft.) in January; locally common, beaten from *Fagus*.

Fam. TINEIDÆ.

Ctenocompa baliodes, Meyr.

Meyrick received his type from Mr. G. Barnard and gave Duaringa, Queensland, as its locality. This is I think almost certainly an error. The late Mr. Barnard probably took this species from Tasmania; indeed, it is known to me only from this island, but Lower records an example from Melbourne.

Narycia retinochra.

Xysmatodoma retinochra, Low., Trans. Roy. Soc. S.A., 1903, p. 71.

♂. 15-17 mm. Head white. Palpi and antennæ pale-fuscous. Thorax fuscous with a white posterior spot. Abdomen grey. Legs fuscous; posterior pair fuscous-whitish. Forewings suboval, costa moderately arched, apex round-pointed, termen obliquely rounded; 7 and 8 stalked; whitish or ochreous-whitish with fuscous strigulæ and markings; a small basal spot; a spot on dorsum at ¼ formed of several conjoint strigulæ; a fascia from 1/3 costa to mid-dorsum.

sometimes irregularly constricted in disc; a second fascia from 2/3 costa to tornus, sometimes bent in middle; a large apical spot, sometimes confluent with second fascia; a fine terminal line; cilia white, sometimes barred with fuscous above tornus. Hindwings and cilia grey.

Closely similar to *N. hamalitha*, Meyr., but may be distinguished by the neuration of forewings and white spot on thorax. Lower's description is misleading, but I have seen specimens named by him in the Littler Collection.

Bothwell in March, Rosebery and Strahan in February; four specimens. Also from Launceston (F. M. Littler).

Narycia toxoteuches, n.sp.

τοξοτευχης, armed with a bow.

♂. 24-26 mm. Head and palpi whitish-grey. Antennæ grey; ciliations in ♂ 1. Thorax fuscous. Abdomen grey. Legs fuscous; posterior pair whitish. Forewings elongate-oval, costa gently arched, apex round-pointed, termen very obliquely rounded; 7 and 8 stalked; grey-whitish with numerous fine transverse fuscous strigulæ; a rather narrow outwardly curved fuscous fascia from 1/3 costa to 2/5 dorsum, somewhat dilated above dorsum; some of the strigulæ tend to form irregular transverse lines; a fuscous line shortly before termen, submarginal; cilia grey-whitish. Hindwings pale-grey, almost translucent; cilia pale-grey.

Cradle Mountain (3,000 ft.) in January (W. B. Barnard); two specimens.

Narycia euctena, n.sp.

εὐκτενος, pectinate.

♂. 22 mm. Head, palpi, thorax, abdomen, and legs fuscous. Antennæ fuscous; in ♂ bipectinate, pectinations 2½, gradually shortening towards base and apex, apical 1/5 simple. Forewings (badly rubbed) triangular, costa slightly arched, apex rounded, termen very obliquely rounded; 7 and 8 coincident; fuscous; three whitish costal spots at ¼, middle, and before ¾; cilia fuscous. Hindwings over 1; fuscous; cilia fuscous.

Being in poor condition the markings on forewings may be inadequately described, but the species differs from all others of the genus in its antennal structure. Type in Coll. Lyell.

Hobart; one specimen.

Mœrarchis lapidea, n.sp.

lapideus, made of stone.

♂. 25 mm. Head and palpi ochreous-grey-whitish. Antennæ grey; in ♂ dentate, ciliations ½. Thorax grey-

whitish with a fuscous spot on each shoulder. Abdomen grey. Legs grey; tarsi with obscure whitish rings. Forewings elongate, not dilated, costa gently arched, more strongly towards apex, apex pointed, termen nearly straight, oblique; grey-whitish; markings fuscous; an outwardly oblique bar from 1/3 costa half across disc; a median subdorsal spot beneath this; four inwardly oblique long striæ from costa beneath 2/3 and apex; two dots on apical half of dorsum, and another on tornus; an interrupted terminal line; cilia ochreous-whitish. Hindwings grey; cilia whitish, bases pale grey.

Strahan in February; one specimen (W. B. Barnard).

Tinea corynephora, n.sp.

κορυνηφορος, club-bearing.

♂. 16 mm. Head whitish. Palpi fuscous; apex whitish. Antennæ fuscous. Thorax whitish; shoulder-flaps fuscous. Abdomen grey. Legs fuscous; tarsi with ochreous-whitish rings. Forewings narrow triangular-oval, costa straight to middle, thence gently arched, apex pointed, termen very oblique; fuscous; a rather broad, irregular-edged, whitish streak from base along fold, broadening at tornus into a large apical blotch which extends to termen and costa, but contains a few fuscous scales; cilia fuscous-whitish, fuscous on middle of termen, on apex dark-fuscous, on termen with a basal series of dark-fuscous bars. Hindwings ovate-lanceolate; grey; cilia 2/3, grey.

Mount Wellington (2,500 ft.) in January; one specimen.

Fam. COSSIDÆ.

Gen. Idioses, nov.

ἰδιοσης, a peculiar moth.

Head rough-scaled. Tongue and maxillary palpi absent. Labial palpi short, porrect, diverging, smooth-scaled. Antennæ of ♂ bipectinated to apex. Thorax smooth. Abdomen with long hairs on dorsum. Posterior tibiæ with long hairs on dorsum. Forewings with forked median vein in cell, stalk and lower branch strongly developed, upper branch weak; chorda and areole absent; all veins present, 2 from angle, 3 and 4 stalked, arising remote from 2, 7, 8, 9 stalked from upper angle, 7 only shortly, 8 to just below apex, 10 and 11 separate, 11 from slightly before angle. Hindwings with a single median vein in cell, cell over ½; 2, 3, 4, 5 separate, 5 from near lower angle, 6 and 7 connate from upper angle, 12 separate.

Although of small size the type species has all the *facies* of a Cossid, and the absence of a tongue together with the strongly developed median vein of forewing are sufficient to refer it to this family. The complete absence of an areole gives it a deceptive resemblance to the *Tineidæ*. Probably the chorda has disappeared by coalescence as in the Neotropical genus *Acyttara*.

Idioses littleri, n.sp.

♂. 27 mm. Head fuscous, posteriorly grey. Palpi fuscous. Antennæ fuscous; pectinations in ♂ 5. Thorax grey. Abdomen whitish-ochreous. Legs fuscous; tibiæ and tarsi with whitish rings. Forewings oval-triangular, costa straight to near apex, apex rounded, termen rounded, moderately oblique; pale-grey with obscure whitish strigulations; an interrupted, transverse, dark-fuscous, sub-basal line, slightly outwardly curved; a series of pale fuscous small costal spots; two or three fuscous transverse strigulæ in disc before middle; a suffused whitish subapical blotch; apical area dark-grey, preceded by three dark-fuscous dots; cilia grey, darker towards apex, paler towards tornus. Hindwings with termen gently rounded; pale brownish-fuscous; cilia pale-grey.

Launceston; one specimen in the Littler Collection, South Australian Museum. I dedicate this interesting species to F. M. Littler, whose early death has been a great loss to entomology.

Fam. HEPIALIDÆ.

Hectomanes rufula, n.sp.

rufulus, reddish.

♂. 20-24 mm. Head and thorax reddish. Antennæ fuscous; pectinations in ♂ 3, gradually shortening to apex. Abdomen grey, reddish-tinged. Legs pale reddish. Forewings short, triangular, costa nearly straight, apex rounded, termen bowed, oblique; reddish; several transverse series of pale fuscous dots variably developed; cilia reddish. Hindwings with termen strongly bowed; fuscous, reddish-tinged; cilia reddish.

♀. 28-32 mm. Forewings narrow, elongate; pale reddish-grey; almost without markings. Hindwings grey. Antennal pectinations ½.

Differs from *H. simulans*, Wlk., in the forewings being shorter, broader, without silvery-white streaks, and with more rounded apices.

Hobart; one ♂ (Lea) Launceston one ♂ (Littler Coll.). Also from Gisborne, Victoria (Geo. Lyell), three ♂, 2 ♀.

Hectomanes pelagia, n.sp.

πελαγιος, by the sea.

♂. 40 mm. Head brown; face fuscous. Antennæ pale ochreous; pectinations in ♂ 6. Thorax, abdomen, and legs fuscous. Forewings semi-oval, costa straight, but sinuate before apex, apex rounded, termen and dorsum uniformly rounded; ochreous-brown becoming grey towards dorsum and termen with scanty whitish irroration between veins; cilia brownish. Hindwings and cilia grey.

♀. 45 mm. Head fuscous. Forewings uniformly grey. Antennal pectinations 1.

Much larger and more stoutly built than the other species of the genus.

Strahan in May; two specimens.

NOTES ON THE HABITS OF THE EXTINCT TASMANIAN RACE.

Number II.

By

WILLIAM L. CROWTHER, D.S.O., M.B.

(Read 20th December, 1926.)

INTRODUCTION.

The Manuscript from which the following extracts were taken was found among the papers of the Rev. R. Knopwood after his death at Rokeby. It is not in his well-known large script (1). The writer describes the Natives as one who has evidently seen much of them at first hand, and his description of their habits agrees very closely with that of other observers. There is no clue to the writer's identity. The MS. is of four pages small quarto and written on both front and back. I am much indebted to J. W. Beattie, Esq., of Hobart, for permission to make these extracts, as the MS. is part of his unique collection of early Tasmanian material.

The interest of the description is twofold: describing as it does, firstly, the daily routine of the Natives, and, secondly, some of the measures proposed or actually tried, in order to control or conciliate them.

As regards the former, apart from the accounts of some of the early Navigators, we have little knowledge of their personal habits. Labillardière (2) and Ross (3) give perhaps the best eye witness account of their feeding.

Both are very much kinder in their observations than is the author of the present description.

In the second part there is much that is new to me. Governor Davey's Proclamation of 1817 is well known (4). This further series of pictorial proclamations was evidently in use in the early part of the administration of Governor Arthur, *circa* 1827-1831, as it was in the early thirties that the Natives were brought in by G. A. Robinson.

In reading these extracts one must bear in mind the extreme degree of partisanship then existing in Hobart Town and that the writer may be in some part ridiculing the Government. The early part of the MS. is, however, so closely in accord with what others have noted that in my belief we should accept it all as correct.

THE ABORIGINAL NATIVES OF VAN DIEMEN'S LAND.

The aboriginal natives of V.D.L., a race that is now nearly extinct (5), were among the lowest of those who possessed the form and language of man. Hunters without domicile except a few pieces of bark which they put together as a shelter from storm and rain and inhabited, if such a term may be used, for a few days during the continuation of bad weather.

Armed with a waddy (a short piece of heavy wood) and a spear fabricated from the long light and taper tea-tree, both of which they used with much missive dexterity. The females alone wearing a slight covering of Kangaroo skins over the shoulders and conveying in a net constructed of fibrous plants the few necessaries required in their simple and savage life, they passed onwards through the woods in pursuit of game through districts which however extensive were bounded by limits well defined and observed by the various tribes. Roused by the dawn like their nearly kindred denizens of the forest, they spread themselves abroad without losing contact and the means of reunion—destroyed the Kangaroo by the stone, the waddy, or the spear—ascended the most lofty Gum trees in search of the Opossum by means of notches cut in the bark, but more by the tenacity of limb peculiar to the climbing animal—extracted the grub from the decayed trunk—dug for the native yam or stripped the wattle of its gum, and about noon collected together, bearing their spoils, for their daily and only meal.

On that occasion the writer has witnessed a scene which the least fastidious must have beheld with disgust. A large fire was quickly made by throwing together the nearest logs of wood, with the addition of small pieces of bark, which were brought in by some of the hunters in a state of ignition apparently part of a continuous combustion which they might have conveyed from one pile to another for years. Then commences the operation of cookery, if such the rapid and barbarous proceeding might be considered. One of the savages, seizing a kangaroo, tosses it on the fire. In a few seconds the hair was singed off and in a few more the dressing complete. He then hastily smears it with half digested grass which he had extracted from the stomach, and darting his fingers with a force and rapidity that could only be compared to that of the talons of some large and powerful bird of prey into the fleshy protuberances near the tail, he

tore out large pieces which he thrust between his lips, thence quickly disappearing, to be immediately followed by others, without any seeming use of the teeth in the haste with which he satisfies his hunger. From each corner of his mouth descends a stream of blood that continues to ornament his visage until his ravenous craving for food was satiated, and after about half an hour employed by his companions devouring their prey in a similar manner the jaws of nearly all who were present appeared to approximate to a state of quiescence. While the brutal process of satisfying their hunger was in progress the boys watched with eager eyes for the seizure of the animals, which the favourite pieces being previously torn from them and gorged were thrown to the ground, and these they dispatched in a similar manner to their parents. The women were last in the order of consideration, as is universal in savage life, and their provision was rather scanty.

During the scene the Chief stood or perambulated aloof. His person was, decorated with various ornaments (rude) composed chiefly of Bone and Berries of attractive and varied colours, and he satisfies his appetite in a manner infinitely more moderate than the inferiors of his tribe. His stature was above the usual standard. His features were remarkable for being comparatively free from the discordant proportions of the others of his tribe; they possessed a relatively intellectual expression, and altogether he presented a rather pleasing example of the aristocracy of nature. A short pause of listlessness and repose succeeded. Amorous attention to the females followed—parties separated and disappeared into the bush. Shrieks and yells of an indescribably wild and acute nature resounded from various quarters, indicating savage mirth and coy estrangement—these by degrees died away, and the close of evening united the tribe around the fire of the day, which in winter was renewed and in summer allowed to die away to its ashes. Such was the course of life of the aboriginal natives of V.D.L., varied only by those feuds with his companions and neighbours which seem inseparable from man in all his phases.

Dismay, self-abasement, and almost horror, were the emotions which it excited when for the first the beholder viewed their dusky figures naked and prostrate on the earth as they sank to a repose only interrupted by an occasional exclamation, more like the indefinite sounds of animal life than the articulate language of human beings, and reflected he must acknowledge them of his race and insomuch of his kindred. . . . . . .

Attacks on the part of the natives, originally provoked by the aggression of the stock-keeper and aggravated by the daily encroachment and occupation of their grounds, had become too frequent to be disregarded. Lives had been lost and the deliberations of the Government at length assumed the shape and form of action. Several paintings on panels (a rather perishable material for their intended use) were executed, the size about 18 inches square. These were divided into compartments each of which represented a series of actions, admonitory to the natives, of the course intended by the Government to be pursued in future towards them. In one were represented natives attacking an unfortunate settler's house, reducing it to ashes and placing him in a rather unsettled situation. In a second a terrified wight, his wig departing in one direction and his hat in another, in the rapidity of his flight, was depicted pursued by them, but fortunately rescued by an ambuscade of soldiers, who by a well-directed discharge checked the advance of the enemy. A third; some of the delinquents in chains and the deadly grip of the constable. A fourth, the Court of Law at Hobart Town and their trial in progress, in which were introduced several striking likenesses of the gentlemen of the bar and one particularly admired, that of the Chief Justice Pedder. The subject of the sixth and final was an experiment on that abstruse subject the oscillation of the Pendulum. A native . . . . etc. One represented a Settler receiving from a native a Kangaroo whom he rewarded by a piece of damper, the name by which bread baked in the ashes was then known. Again was seen the Governor in Regimentals surrounded by a number of aboriginals and patting on the head in the most condescending manner a Pickaninny or infant child. Next appears a minister of the church expounding to his dusky audience the truth of Christianity to the evident astonishment and delight and full perception of his hearers. Lastly, one of them appeared mounted on a horse and blowing a horn with a large leathern bag attached to his saddle, by which was indicated that in the event of their discontinuing hostilities and adopting a peaceful and orderly demeanour, official rank and station should be open to them, and that in time they might even aspire to the dignified and confidential employment of postmen.

These were affixed to trees in distant parts of the island, and the aid of even the infinitesimal calculus must have failed in estimating the chances of their having been observed, or, if observed, understood by those to whom they were directed.

Nothing more was heard of them, and the next step was of a more decisive and efficient nature.

A proclamation was issued by which the natives were incorporated with the other British subjects in the island, endowed with all their rights to the protection of the laws and also made liable to the penalties incurred by their violation. Many differences of opinion, however, existed as to the manner of apprising them of these beneficent intentions. At last it was suggested that the Bellman should be sent through the bush, provided with copies which he might distribute, reciting also their contents to audiences collected in the usual manner. That Functionary, however, was evidently startled at such an unexpected and indeed unreasonable proposition, and evinced much reluctance to undertake an adventure in the prosecution of which some danger might be incurred. He asserted with great appearance of truth that his official duties were limited to the most public street of Hobart Town.

A further expedient considered was to instruct a captured Aborigine in the general principals of Cons. Law and subsequently to dismiss him to his countrymen in order to impart to them the matter adverted to in the Proclamation. . . . .

The manuscript, which is unsigned and incomplete, ceases at this point.

REFERENCES.

(1) The Rev. R. Knopwood was the official Chaplain to the expedition of Lieutenant-Governor Collins, who founded Hobart in 1804. After many years of service at the settlement he was appointed to Clarence Plains. He died at Rokeby in 1838.

(2) Labillardière. *Voyage in search of La Pérouse*, pp. 306-9.

(3) Ross. *Hobart Town Almanack*, 1830, pp. 100-1.

(4) A copy of this very rare Proclamation may be seen in the Tasmanian Museum.

(5) This sentence seems to show that the MS. was written at least 20-25 years after the events described, as about that time they were within measurable distance of extinction.

NOTE.

VOLCANIC ROCK AT ONE-TREE POINT, SANDY BAY.

Attention is called to a paper by W. Auroussean entitled *Analyses of Three Australian Rocks*, published in The Proceedings of the Linnean Society of N.S.W., 1926, Vol. 51, Part 4, No. 208, p. 614, in which the learned author describes this much disputed rock as a Nephelite-Basanite, and gives detailed analyses and other useful information.

A.N.L.

THE ROYAL SOCIETY OF TASMANIA

ABSTRACT OF PROCEEDINGS

1926.

8th MARCH, 1926.

Annual Meeting.

The Annual Meeting was held on the 8th March at the Royal Society's Rooms, The Tasmanian Museum, Hobart, the President of the Society, His Excellency Sir James O'Grady, K.C.M.G., presiding.

The Annual Report was read and adopted. The following were elected members of the Council for 1926:—Mr. L Rodway, Right Reverend Dr. R. S. Hay, Mr. W. H. Clemes, Dr. W. L. Crowther, Mr. W. H. Cummins, Major L. F. Giblin, Messrs. J. A. Johnson, A. N. Lewis, E. E. Unwin, and C. E. Lord (*ex officio*).

Paper.

The following paper was read:—

"The Isostatic Background of Tasmanian Physiography." By A. N. Lewis, M.C., LL.M.

Illustrated Lecture.

Mr. Lewis delivered an illustrated lecture on "The Origin of our Tasmanian Mountains."

19th APRIL, 1926.

The Monthly Meeting was held in the Society's Rooms on the 19th April, 1926, Mr. L. Rodway, Vice-President, presiding.

The following were elected as members of the Society:—Mrs. Annie Lindon, Reverend W. R. Barrett, Mr. Eric Waugh.

Reference was made to the monument erected on Lord Howe Island in memory of the late Allan R. McCulloch.

Lecture.

Mr. Frank Ellis delivered a lecture entitled "Some Aspects of Modern Science."

10th MAY, 1926.

The Monthly Meeting was held in the Society's Rooms on the 10th May, Mr. L. Rodway, Vice-President, presiding.

The following were elected as members of the Society:—Dr. C. N. Atkins, Professor E. J. G. Pitman, and Mr. B. N. Whittle.

Lecture.

Mr. Clive Lord delivered a lecture upon "The Fur Seals of Tasmania."

14th JUNE, 1926.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, Mr. L. Rodway, Vice-President, presiding.

Papers.

The following papers were read:—

"The Oil Shales of Tasmania." By A. McIntosh Reid.

"On the Planting of the Dutch Flag in Tasmania in 1642." By Clive Lord.

12th JULY, 1926.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, His Excellency Sir James O'Grady presiding.

The following were elected members of the Society:—Dr. D. O. Shiels, Mrs. Rivers, Miss Rivers, Mrs. Robson.

Delegates were appointed to confer with the Launceston Branch *re* the formation of an Historical Section.

Lecturettes.

Several members of the Historical Section delivered a series of Lecturettes dealing with the period during which Sir William Denison was Governor of Tasmania.

9th AUGUST, 1926.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, Mr. L. Rodway, Vice-President, presiding.

Mr. A. N. Lewis drew attention to the filming of "The Term of His Natural Life," and a resolution protesting against the filming was carried.

Lecture.

Mr. W. H. Cummins delivered a Lecture on "The Evolution of the Tasmanian Press."

11th OCTOBER, 1926.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, on the 11th October, Mr. L. Rodway, Vice-President, presiding.

The following were elected as members of the Society:—Messrs. R. W. Giblin, D. C. MacKenzie, David Meredith, and F. E. Ward.

Papers.

The following papers were read:—

"Studies in Tasmanian Spiders." Part I. By V. V. Hickman, B.Sc.

"Studies in Tasmanian Cetacea." Part V. By H. H. Scott and Clive Lord.

"Two Hydromedusoid Records for Tasmania." By Professor T. T. Flynn. (Communicated by L. Rodway.)

Lecture.

Brigadier-General C. H. Jess delivered an address upon "Some Economic and Political considerations in relation to Defence, with particular reference to Tasmania."

8th NOVEMBER, 1926.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, on Monday, 8th November, Mr. L. Rodway, Vice-President, presiding.

Lecturettes.

A discussion took place concerning the need for the conservation of the Tasmanian fauna.

The following Lecturettes were delivered:—

"The Sea Mammals." By Dr. W. L. Crowther.

"The Land Mammals." By C. E. Lord.

"The Birds." By M. S. R. Sharland.

20th DECEMBER, 1926.

A meeting was held at the Society's Rooms on Monday, 20th December, Mr. L. Rodway presiding.

Mr. Walter E. Taylor was elected Auditor in place of Mr. R. A. Black, who resigned owing to his departure from the State.

Papers.

The following papers were read:—

"Notes on, and Additions to, the Chiton Fauna of North-West Tasmania, together with a brief Review of the Genus *Stenochiton*." By Edwin Ashby, F.L.S.

"A Note on *Eucalyptus johnstoni*, Maiden." By L. Rodway, C.M.G.

"New and Little-known Tasmanian Lepidoptera." Part II. By A. Jefferis Turner, M.D., F.E.S.

"Notes on the Habits of the Extinct Tasmanian Race." By W. L. Crowther, D.S.O., M.A.

ANNUAL REPORT

1926.

THE ROYAL SOCIETY OF TASMANIA

Patron:

HIS MAJESTY THE KING.

President:

HIS EXCELLENCY SIR JAMES O'GRADY, K.C.M.G.

Vice-Presidents:

L. RODWAY, C.M.G.
A. H. CLARKE, M.R.C.S., L.R.C.P.

Council:
(Elected March, 1926)

L. RODWAY, C.M.G. (Chairman)
RT. REV. R. S. HAY, D.D.
W. H. CLEMES, B.A., B.Sc.
W. E. L. CROWTHER, D.S.O., M.B.
W. H. CUMMINS, A.I.A.C.
L. F. GIBLIN, D.S.O.
J. A. JOHNSON, M.A.
A. N. LEWIS, M.C., LL.M.
CLIVE LORD, F.L.S.
E. E. UNWIN, M.Sc.

Standing Committee:

L. RODWAY, W. H. CLEMES, L. F. GIBLIN, C. LORD.

Hon. Treasurer:

W. E. L. CROWTHER, D.S.O., M.B.

Editor:

CLIVE LORD, F.L.S.

Auditor:

WALTER E, TAYLOR, F.F.I.A., F.I.A.S.

Secretary and Librarian:

CLIVE LORD, F.L.S.

LIST OF MEMBERS

Honorary Members:

David, Sir T. W. Edgeworth, K.B.E., C.M.G., B.A., F.R.S., F.G.S., Emeritus Professor of Geology and Physical Geography in the University of Sydney. "Coringah," Sherbroke Road, Hornsby, N.S.W.

Mawson, Sir Douglas, D.Sc., B.E., F.R.S. Professor of Geology and Mineralogy, the University of Adelaide, South Australia.

Spencer, Sir William Baldwin, K.C.M.G., M.A., D.Sc., Litt.D., F.R.S. Melbourne.

Wood-Jones, Professor F., M.B., B.S., M.R.C.S., L.R.C.P., F.R.S. Professor of Anatomy, The University, Adelaide.

Corresponding Members:

Year of Election.

1901 Benham, W. B., M.A., D.Sc., F.R.S., F.Z.S. Professor of Biology, University of Otago, Dunedin, N.Z.

1892 Bragg, Sir W. H., M.A., F.R.S. Director of the Royal Institution, Albemarle Street, London.

1901 Chapman, Professor R. W., M.A., B.C.E. The University, Adelaide.

1875 Liversidge, Professor A. "Fieldhead," Coombe Warren, Kingston, Surrey, England.

1923 Pulleine, R., M.B. 163 North Terrace, Adelaide.

1902 Smith, R. G., D.Sc. Linnean Hall, Linnean Society of N.S.W., 16 College Street, Sydney.

1892 Thomson, Hon. G. M., M.L.C., F.L.S. 99 Eglinton Road, Dunedin, N.Z.

1901 Wall, A., Professor, M.A. Canterbury College, Christchurch, N.Z.

Life Members:

1918 Avery, J. 52 Southerland Road, Annadale, Melbourne.

1908 Baker, H. D. American Consular Service, Washington.

Year of Election.

1890 Foster, Lieutenant-Colonel Henry. "Merton Vale," Campbell Town.

1905 Grant, C. W. "High Peak," Huon Road.

1921 Harvey, D. H. "Manresa," Lower Sandy Bay.

1894 Mitchell, J. G. Parliament Street, Sandy Bay.

1896 Sprott, G., M.D. Town Hall, Hobart.

Members:

1921 Anderson, G. M., M.D., C.M. Clare Street, New Town.

1923 Agnew, Miss K. Augusta Road, New Town.

1925 Alexander, Miss H. Brown's River.

1921 Allen, D. V., B.Sc. Launceston Technical School, Launceston.

1924 Allen, F. A. 13 Franklin Street, West Hobart.

1925 Ashbolt, Sir Alfred. "Lenna," Battery Point.

1926 Atkins, Dr. C. N. Brown's River.

1921 Baker, H. S., LL.B. Messrs. Griffiths, Crisp, and Baker, Collins Street, Hobart.

1887 Barclay, D. 143 Hampden Road, Hobart.

1921 Barr, J. S., M.D. (Glasgow). Lower Sandy Bay.

1926 Barrett, Rev. W. R. Cressy, Tasmania.

1890 Beattie, J. W. 28 Jordan Hill Road.

1918 Bellamy, H., J.P., M.Am.Soc. C.E., M.I.Mech.E., F.R. San. I. Government Hydraulic Engineer, Adelaide.

1924 Bennett, Dr. H. W., L.D.S., D.D.S. Brisbane Street, Launceston.

1903 Bennett, W. H. Ashby, Ross.

1921 Bertouch, V. von. Wellington Square Practising School, Launceston.

1921 Bethune, Rev. J. W. Church Grammar School, Launceston.

1922 Biss, F. L. U.S.S. Co., Hobart.

1909 Blackman, A. E. Franklin.

1920 Blaikie, T. W. Practising School, Elizabeth Street, Hobart.

1928 Bowling, J. "Barrington," Tower Road, New Town.

1924 Booth, N. P. Messrs. Cadbury-Fry-Pascall Ltd., Claremont.

1925 Bowden, F. P. Jordan Hill Road.

1925 Bowerman, Captain. Marine Board, Hobart.

1923 Breaden, J. C. 12 Waverley Avenue, New Town.

1923 Brett, R. G. 53a Hill Street, Hobart.

Year of Election.

1917 Brettingham-Moore, E., M.B., Ch.M. Macquarie Street, Hobart.

1925 Brigden, Professor J. B., B.A. Tasmanian University, Hobart.

1911 Brooks, G. V. Director of Education, Hobart.

1922 Brownell, C. C. 117 Hampden Road, Battery Point.

1907 Brownell, F. L. "Berwyn," Mercer Street, New Town.

1924 Budge, E. A., B.Sc. 302 Argyle Street, Hobart.

1918 Burbury, Frederick. "Holly Park," Parattah.

1919 Burbury, Charles. "Brookside," Moonah.

1925 Butler, A. L. Lower Sandy Bay.

1923 Butler, Mrs. G. H. Augusta Road, New Town.

1909 Butler, W. F. D., B.A., M.Sc., LL.B. Bishop Street, New Town.

1924 Calver, C. W. 112 Brisbane Street, Launceston.

1920 Cane, F. B. 90 High Street, Sandy Bay.

1913 Chepmell, C. H. D. Clerk of the Legislative Council, Hobart.

1920 Clark, W. I., M.B. Macquarie Street, Hobart.

1896 Clarke, A. H., M.R.C.S., L.R.C.P. Domain Cottage, The Domain, Hobart.

1918 Clarke, T. W. H. "Quorn Hall," Campbell Town.

1910 Clemes, W. H., B.A., B.Sc. Clemes College, Hobart.

1922 Collier, J. D. A. The Librarian, Tasmanian Public Library, Hobart.

1925 Coogan, W. Lord Street, Sandy Bay, Hobart.

1924 Crabtree, R. W. The University, Hobart.

1924 Crisp, Cecil C. Lower Sandy Bay.

1911 Crowther, W. L., D.S.O., M.B. Macquarie Street, Hobart.

1917 Cullen, Rev. John. Macquarie Street, Hobart.

1918 Cummins, W. H., A.I.A.C. Manager, *The Mercury* Office, Hobart.

1925 Cunningham, Mrs. G. H. Augusta Road, New Town.

1925 Cunningham, G. H. 22 Augusta Road, New Town.

1922 Davidson, R. Temple Chambers, Macquarie Street, Hobart.

1924 Davies, G. B. 111 Patrick Street, Hobart.

1919 Davies, H. W. "Abermere," Mount Stuart.

1923 Davis, Alfred. Lord Street, Sandy Bay.

1923 Davis, Charles. Red Chapel Road, Lower Sandy Bay.

1908 Dechaineux, L. Technical College, Hobart.

1921 Dryden, M. S. 13 Hillside Crescent, Launceston.

1921 Eberhard, E. C. Charles Street, Launceton.

Year of Election.

1923 Edwards, Hon. F. B., M.L.C. Ulverstone.
1919 Elliott, E. A., M.B., Ch.M. Main Road, New Town.
1918 Ellis, F., M.A., B.E. Education Department, Hobart.
1921 Emmett, E. T. Railway Department, Hobart.
1921 Erwin, H. D. Hutchins School, Hobart.
1918 Evans, L. Secretary Agricultural Department, Hobart.
1921 Eyre, H. Manual Training School, Launceston.
1902 Finlay, W. A. 11 Secheron Road, Hobart.
1918 Fletcher, C. E. Education Department, Hobart.
1921 Forward, J. R. Mechanics' Institute, Launceston.
1921 Fox, Miss. Ladies' College, Launceston.
1918 Gatenby, R. L. Campbell Town.
1922 Giblin, A. V. King Street, Sandy Bay.
1925 Giblin, Miss Ella. 326 Macquarie Street, Hobart.
1908 Giblin, Major L. F., D.S.O., B.A. Davey Street, Hobart.
1926 Giblin, R. W. 77 Harrington Gardens, London, S.W. 7.
1924 Giblin, W. W., M.R.C.S., L.R.C.P. Macquarie Street, Hobart.
1923 Gorringe, J. A. Kempton, Tasmania.
1923 Gould, H. T. Liverpool Street, Hobart.
1924 Gray, H. 93 Macquarie Street, Hobart.
1923 Green, Dr. A. W. 30 Parliament Street, Sandy Bay.
1921 Hall, E. L. 38 Lyttleton Street, Launceston.
1922 Halligan, G. H., F.G.S. "Alameda," Challis Avenue, Turramurra, N.S.W.
1918 Harrap, Lieutenant-Colonel G. Launceston.
1924 Hawker, Mrs. J. F. 204 Davey Street, Hobart.
1919 Hay, Rt. Rev. R. S., D.D. Bishop of Tasmania, Bishopscourt, Hobart.
1924 Henry, Dr. C. C., M.B., F.R.C.S. St. John Street, Launceston.
1924 Heritage, F. W. Collins Street, Hobart
1921 Heritage, J. E. Frederick Street, Launceston.
1921 Heyward, F. J., F.R.V.I.A. 43 Lyttleton Street, Launceston.
1915 Hickman, V. V., B.Sc. Mulgrave Crescent, Launceston.
1914 Hitchcock, W. E. Moina, Tasmania.
1921 Hogg, W. Public Buildings, Launceston.
1918 Hogg, G. H., M.D., C.M. 37 Brisbane Street, Launceston.
1922 Hood, F. W. Customs House, Hobart.

Year of Election.

1921 Horne, G., V.D., M.D., M.S., Ch.B. Lister House, Collins Street, Melbourne.
1923 Hudspeth, W. H. "The Nook," Lower Sandy Bay.
1923 Hungerford, Mrs. "Red House," Fern Tree.
1923 Hungerford, Miss. "Red House," Fern Tree.
1909 Hutchison, H. R. 1 Barrack Street, Hobart.
1922 Huxley, G. H., M.A. Kent Avenue, West Hobart.
1913 Ife, G. W. R., LL.B. Mortimer Avenue, New Town.
1925 Irby, L. G. Conservator of Forests, Forestry Department, Hobart.
1898 Ireland, E. W. J., M.B., C.M. Launceston General Hospital, Launceston.
1919 Jackson, George A. 79 Collins Street, Hobart.
1906 Johnson, J. A., M.A. Training College, Hobart.
1922 Johnson, W. R. Clemes College, Hobart.
1922 Johnston, J. R. Murray Street, Hobart.
1921 Judd, W., M.A. College Street, Launceston.
1911 Keene, E. H. D., M.A. Burnie.
1922 Kemp, Andrew. Stoke Street, New Town.
1922 Kennedy, J. 96 Montpelier Road, Hobart.
1924 Kennedy, Mrs. J. 96 Montpelier Road, Hobart.
1910 Kermode, R. C. Mona Vale, Ross, Tasmania.
1918 Knight, C. E. L., B.Sc. Claremont.
1919 Knight, H. W. National Mutual Buildings, Hobart.
1913 Knight, J. C. E. Claremont.
1924 Legge, R. W. Cullenswood, Tasmania.
1919 Lewis, A. N., M.C., LL.M. "Werndee," Augusta road, New Town.
1887 Lewis, Sir N. E., K.C.M.G., M.A., B.C.L., LL.B. Augusta Road, New Town.
1912 Lindon, L. H. "The Lodge," Park Street, Hobart.
1926 Lindon, Mrs. "The Lodge," Park Street, Hobart.
1900 Lines, D. H. E., M.B., Ch.B. Archer Street, New Town.
1921 Listner, W. P., M.A., LL.B. Augusta Road, New Town.
1912 Lord, Clive E., F.L.S., Director of the Tasmanian Museum. "Cliveden," Sandy Bay.
1921 Lord, Raymond. "Handroyd," 6 Franklin Street, Hobart.
1924 Lord, Ronald. Derwentwater Avenue, Sandy Bay.
1922 Low, H. M. "The Gables," Pottery Road, New Town.
1893 McAulay, Professor A., M.A. The University, Hobart.
1923 McAulay, A. L., Ph.D. The University, Hobart.
1921 McClinton, Dr. R. 70 St. John Street, Launceston.

Year of Election.

1922 Macleod, Mrs. L. H. High Street, Sandy Bay.
1919 Mackay, A. D. 83 Patterson Street, Launceston.
1926 Mackenzie, D. C. Manager, Catamaran Coal Mine, Catamaran, Tasmania.
1918 Mansell, A. E. Arthur Street, West Hobart.
1924 Marsh, James. "Westella," Elizabeth Street, Hobart.
1918 Martin, Brigadier-General W. Launceston.
1921 Masters, A. H. A.M.P. Chambers, Launceston.
1926 Meredith, David. Electrolytic Zinc Co., Risdon.
1921 Meston, A. L. 115 Canning Street, Launceston.
1909 Millen, Senator J. Roxburgh, Newstead.
1907 Miller, L. S., M.B., Ch.B. 156 Macquarie Street, Hobart.
1921 Miller, R. M. State High School, Launceston.
1911 Montgomery, R. B. "Astor," Macquarie Street, Hobart.
1918 Murdoch, M.L.C., Honourable Thomas. 55 Montpelier Road, Hobart.
1926 Murray, L. C. 124 Warwick Street, Hobart.
1921 Muschamp, Rev. E. Holy Trinity Rectory, Launceston.
1925 Nettlefold, R. Macquarie Street, Hobart.
1924 Newall, A. P. Charles Street, Moonah.
1882 Nicholas, G. C. "Cawood," Ouse.
1918 Nicholls, Sir Herbert, Chief Justice of Tasmania. Pillinger Street, Sandy Bay.
1910 Nicholls, H. M. Department of Agriculture, Hobart.
1921 Nye, P. B., M.Sc., B.M.E. Geological Survey Office, Hobart.
1917 Oldham, N. New Town.
1921 Oldham, W. C. 39 George Street, Launceston.
1924 Oliver, H. Lindisfarne.
1922 Overell, Miss Lilian. Holebrook Place, Hobart.
1921 Padman, R. S. 56 St. John Street, Launceston.
1921 Patten, W. H. 59 Cameron Street, Launceston.
1923 Parker, Dr. G. M. Bellerive.
1922 Parker, H. T. "Montana," Bellerive.
1925 Pearse, D. C. "Garstang," Fisher's Avenue, Lower Sandy Bay.
1923 Pedder, A. Stoke Street, New Town.
1922 Perrin, Miss K. C/o Mrs. Harner, 12 York Street, Launceston.
1902 Piesse, E. L. "Merridale," Sackville Street, Kew, Melbourne.
1910 Pillinger, J. 4 Fitzroy Crescent, Hobart.
1926 Pitman, Professor E. J. G. Tasmanian University, Hobart.

Year of Election.

1918 Pitt, F. C. K. "Glen Dhu," The Ouse.

1925 Pratt, A. W. Courtney. "Athon," Mount Stuart Road, Hobart.

1925 Propsting, G. L. Earl Street, Sandy Bay.

1923 Purcell, G. A. Clemes College, Hobart.

1921 Reid, A. McIntosh. Geological Survey Office, Hobart.

1922 Reid, A. R. Curator, Beaumaris Zoo, Domain, Hobart.

1925 Reid, Miss M. L. The University, Hobart.

1921 Reid, W. D. Public Buildings, Launceston.

1921 Reynolds, John. Knocklofty Terrace, Hobart.

1926 Rivers, Miss. The Deanery, Hobart.

1926 Rivers, Mrs. Godfrey. Holebrook Place, Hobart.

1925 Robinson, F. G. 42 Regent Street, Sandy Bay.

1926 Robson, Mrs. "Elsinore," The Avenue, Elphin Road, Launceston.

1884 Rodway, L., C.M.G. 77 Federal Street, Hobart.

1923 Rogers, G. H. B. 204 Davey Street, Hobart.

1921 Rolph, W. R. *Examiner* and *Courier* Office, Launceston.

1913 Ross, Hector. Cambridge, Tasmania.

1922 Sargison, H. Elizabeth-street, Hobart.

1921 Savigny, J. A.M.P. Chambers, Launceston.

1921 Scott, H. H. Curator, Victoria Museum, Launceston.

1896 Scott, R. G., M.B., Ch.M. 172 Macquarie Street, Hobart.

1921 Sharland, M. S. R. *The Mercury* Office, Hobart.

1921 Shields, M.L.C., Honourable Tasman. 13 Patterson Street, Launceston.

1926 Shiels, Dr. 118 Main Road, Moonah.

1925 Shoobridge, K. Macquarie Plains, Tasmania.

1921 Shoobridge, Honourable L. M. "Sunnyside," New Town.

1925 Shoobridge, Rupert. "Fenton Forest," Glenora.

1923 Shoobridge, S. E. C/o Messrs. H. Jones and Co, Hobart.

1923 Simson, Mrs. L. 3 St. George's Square, Launceston.

1925 Smith, Colonel R. P. A.M.P. Society, Hobart.

1921 Smithies, F. 34 Patterson Street, Launceston.

1925 Stackhouse, C. K. R. 55 Patterson Street, Launceston.

Year of Election.

1924 Stephens, Crofton. Messrs. Clerk, Walker, Stops, and Stephens, Collins Street, Hobart.

1919 Stevenson, Miss F. "Leith House," New Town.

1920 Swindells, A. W. 2 Patrick Street, Hobart.

1918 Taylor, W. E. Elboden Street, Hobart.

1920 Taylour, W. H. Equitable Buildings, Collins Street, Melbourne.

1923 Thomas, J. F. Room 8, Wilga Chambers, 158 Phillip Street, Sydney.

1922 Thomas, Lieutenant-Colonel L. R., D.S.O. Registrar of the Tasmanian University, Hobart.

1921 Thomas, P. H. Agricultural Department, Hobart.

1922 Thompson, E. H. Lower Sandy Bay.

1918 Thorold, C. C. Hutchins School, Hobart.

1926 Turner, A. Jefferis, M.D., F.E.S. Wickham Terrace, Brisbane, Queensland.

1923 Unwin, E. E., M.Sc. Pendle Hill, Mortimer Avenue, New Town.

1925 Urquhart, M. L. Ashfield Street, Sandy Bay.

1918 Walch, P. B. C. King Street, Sandy Bay.

1925 Walker, Norman. The Hutchins School, Hobart.

1926 Ward, F. E. Director of Agriculture, Hobart.

1913 Wardman, John. Superintendent Botanical Gardens, Hobart.

1918 Waterhouse, G. W. Messrs. Ritchie and Parker, Alfred Green and Co., Launceston.

1922 Waterworth, E. N. Poet's Road, West Hobart.

1922 Watson, D. W. "Undine," Glenorchy.

1926 Waugh, Eric C., LL.B. High Street, Sandy Bay.

1922 Wayn, Miss A. L. Lower Sandy Bay.

1918 Weber, A. F. Lands Department.

1923 Webster, Hugh C. "Greystanes," Lower Sandy Bay.

1923 Wherrett, Miss A. Florence Street, Moonah.

1926 Whittle, B. N. Augusta Road, New Town.

1922 Winch, A. A. "Stornoway," Huon Road, Hobart.

1925 Winch, M. C/o Brownell Bros., Hobart.

1901 Wise, H. J. Lambert Avenue, Sandy Bay.

1924 Young, F. M., B.A. Montagu Street, New Town.

ANNUAL REPORT

1926.

The Council and Officers.

The Annual Meeting was held at the Society's Rooms, The Tasmanian Museum, Hobart, on the 8th March, 1926.

The following were elected members of the Council for 1926:—Messrs. W. H. Clemes, Dr. W. L. Crowther, W. H. Cummins, Major L. F. Giblin, Rt. Rev. Dr. R. S. Hay, Messrs. J. A. Johnson, A. N. Lewis, L. Rodway, E. E. Unwin, and C. E. Lord (*ex officio*).

During the year nine meetings of the Council were held, the attendance being as follows:—Mr. Rodway 9, Mr. Lord 9, Dr. Crowther 8, Mr. Lewis 8, Mr. Johnson 6, Mr. Clemes 5, Mr. Cummins 5, Major Giblin 5, and Mr. Unwin 5.

The Council at its first meeting made the following appointments:—

Chairman of Council.—Mr. L. Rodway, C.M.G.

Secretary.—Mr. Clive Lord.

Standing Committee.—Messrs. Rodway, Unwin, Lord, and Major Giblin.

Editor of Papers and Proceedings.—Mr. Clive Lord.

Hon. Treasurer.—Dr. W. L. Crowther.

Trustees of the Tasmanian Museum and Botanical Gardens:—Messrs. Rodway, Clemes, Lewis, Johnson, Unwin, and Dr. Crowther.

Meetings.

During the year nine ordinary meetings of the Society were held. Details of the meetings will be found in the Abstract of Proceedings.

Membership.

The Royal Society of Tasmania, in company with many other bodies, felt the effects of the period of financial depression from which Tasmania is just recovering. This is reflected in the membership, and a certain percentage of

subscriptions are still outstanding for the year, whilst certain members have allowed their membership to lapse. Whilst this is to be regretted, it is felt that the slight set-back is of a temporary nature only, and that the improved conditions which may be anticipated with confidence during the coming year will be of considerable assistance to the work of the Society. The roll at the end of the year shows:—4 Honorary Members, 8 Corresponding Members, 7 Life Members, and 230 Ordinary Members.

Historical.

In July, a conference was held in Launceston between members of the Northern Branch and representatives of the Council and the Historical Section with the object of advancing the study of early Tasmanian history and the collection of old documents. The Chairman (Mr. Rodway), Messrs. W. F. D. Butler, G. W. R. Ife, and C. E. Lord attended the meeting of the Northern Branch, and it is anticipated that benefit will arise from the conference.

At the general meeting of the Society held in August, the Council brought under notice of the members the proposal to film "The Term of His Natural Life," and, on the grounds that the novel is not true to history, and that its filming would be harmful to Tasmania, a resolution was carried protesting against the picture being made.

In last year's report reference was made to extracts from certain private diaries which had been made available to the Society, and the Council desires to place on record its appreciation of the action of Miss Hookey in permitting a copy to be made for the Society's Library of the original diary of the Reverend Robert Knopwood from January, 1805, to July, 1808. This section of the Knopwood diaries, which has not been made public previously, is of very considerable interest, and will prove a valued addition to the Society's Library.

Scientific Development of the Tasmanian Fisheries.

Since the very commencement of the official control of the fisheries of Tasmania, the Royal Society has been intimately connected with the movement. The greater part of the literature concerning the fishes of Tasmania is contained in the Papers and Proceedings of the Society, and the Society can claim to have done much owing to the investigations of its members and the publication of the results. In the past

due recognition has been given to the Society's work. Last year, however, the Government abolished the Fisheries Commissioners and placed the control of the sea and inland fisheries under separate boards. The work done by the Society and the important bearing which science has on the commercial prosperity of the sea fisheries was brought under notice of the Government, but unfortunately the past and present work of the Society failed to secure recognition, and the Sea Fisheries Board, as now composed, does not embrace a member of the Society, and the Society's official connection with the development of the Tasmanian fisheries has come to an end. This is a matter for regret, as in other countries increasing efforts are being made to encourage scientific institutions to become interested in and assist the development of the commercial activities of their country.

Science Congress.

The Council desires to bring under the notice of the members generally the fact that the Australasian Association for the Advancement of Science is holding a meeting in Hobart, commencing on the 16th January, 1928. The support of all members of the Society is desired in order that this important conference may prove a success and of distinct benefit to Tasmania in general.

Papers and Proceedings.

The financial position of the Society caused the Council to curtail the number of Papers printed in this year's volume. The position will require the earnest consideration of the incoming Council in order that all papers which are submitted and passed for printing next year may be published in full. The cost of a large proportion of this year's volume is not included in the Statement of Accounts.

Obituary.

It is with regret that the Society has to record the deaths of the following:—

Life Members:—

J. D. Foster, "Fairfield," Epping. (Elected 1905.)
Sir Henry Jones, Kt., Hobart. (Elected 1922.)

Members:—

Most Reverend Patrick Delany, Archbishop of Tasmania. (Elected 1903.)

H. E. R. Oldmeadow, "Roseneath," Austin's Ferry. (Elected 1919.)

BRANCH REPORT

NORTHERN BRANCH.

ANNUAL REPORT FOR 1926.

Our Annual Meeting was held on 21st May, when the following officers were re-elected members of the Council:—Hon. Tasman Shields, Messrs. H. H. Scott, J. E. Heritage, R. O. Miller, F. Smithies, J. R. Forward, F. J. Heyward, W. D. Reid, and R. S. Padman (Hon. Secretary and Treasurer).

At the conclusion of the formal business a most interesting Lecture was given by Mr. V. V. Hickman, B.Sc., on "Spiders and their Allies," introducing lantern slides of several new Tasmanian species recently discovered by the lecturer.

21st June.—Lecture by Mr. J. Moore-Robinson, F.R.G.S., on "Macquarie in Launceston, 1811 and 1821."

23rd July.—Visit from members Historical Section (Hobart) accompanied by Mr. L. Rodway, Senior Vice-President. At the conclusion of conference relating to establishment of Historical Section in connection with this Branch, a series of papers were read by Messrs. Dennis Butler (Chairman Historical Section), G. W. Ife, and C. Lord dealing with "Tasmania under Sir William Denison."

6th September.—Paper, "Evolution of the Sense of Sight," by Mr. R. S. Padman, followed by notes on the morphology of the Eye, illustrated with miscropic slides by Mr. H. H. Scott.

27th September.—Lecture by Mr. F. Ellis, M.A., B.E., on "The Ideas underlying Relativity."

Considerable interest in early Tasmanian History having been aroused by the several lectures given during the year, the local council have considered the formation of a local branch of the Historical Section which it is hoped to establish early in next session. By special arrangement with the parent Society permission has been granted, in the event of the local Section ceasing to function, that any local relics or documents collected by it may be deposited in the Museum or other public institution, so that they may be permanently retained in Launceston.

SECTION REPORTS

EDUCATIONAL AND PSYCHOLOGICAL SECTION.

Mr. E. E. Unwin, M.Sc., was elected President.

All meetings of the year were devoted to a discussion of the System of Examinations, under different aspects, the list of subjects and speakers being as follows:—

20th April.—"An Historical Survey of the Development of Examination Systems." By Mr. J. A. Johnson.

18th May.—"The Aim and Purpose of Examinations in Primary and Secondary Schools." By Messrs. H. T. Parkes and E. A. Budge.

22nd June.—"The Purpose and Aim of Examinations as applied to University and Technical Education." By Mr. Frank Ellis and Professor Dunbabin.

27th July.—"The Mind of the Examinee." By Mr. G. Huxley.

17th August.—"The Accrediting System." By Mr. C. E. Fletcher.

21st September.—"The Statistical Aspect of Examinations." By Major L. F. Giblin.

19th October.—A Summary of Papers and Discussions, by the President.

As a result of these meetings, the Section reached certain definite conclusions, set out hereunder, which are regarded as applying not only to boys but to girls in equal or even greater measure.

It is felt that, while some form of testing is not only essential but, in fact, inevitable, yet the present system of external public examinations does not meet the requirements of the situation, for the following reasons in particular:—

These examinations are so limited in their nature that they cannot give results that are an adequate return for the effort expended.

By reason of being the accepted test of learning they encourage false conclusions as to a pupil's requirements, and so often work injustice both to him and to his teacher.

They hamper general education by checking the development of individuality and self-reliance, while leaving little room for necessary experiment or for getting the full benefit of a teacher's personal influence.

They produce real unhappiness and often injure physical and mental health in a manner that, though subtle, is very far-reaching.

What is required is a method of testing that will not encourage a special preparation for it, and will best discover and recognise sustained industry.

To satisfy these requirements and to meet the foregoing objections, the Section recommends the adoption of the Accrediting System, by which approved schools, under proper safeguards and as an accepted alternative to public examinations, would supply certificates of proficiency to those pupils who have reached a required standard.

Some essentials of the System were laid down in Mr. Fletcher's paper which, by request of the Section, was published in the Educational Record (September issue). Such essentials were considered by Mr. Fletcher to be the following:—

(a) There must be an accrediting authority (which might be an association formed for this special purpose).

(b) Any examination must be of the school rather than of the individual.

(c) Considerable reliance must be placed upon the responsible teachers, who are recognised as the most capable judges of an individual pupil's attainments and ability.

(d) There must be inspection, for report to the accrediting authority.

(e) Internal examinations must be conducted, with questions and marked papers filed for future reference.

(f) The public must be guided to recognise the value and prestige of the system.

It is noteworthy that in 1921 the Section, as in this year, devoted all its sessions to a discussion of public examinations; and to the extent to which the aspects of the question considered are identical, seems to have arrived at precisely similar conclusions to those submitted in this report; which, in their turn, were formed without any reference whatever to those of 1921.

NORMAN WALKER,
Honorary Secretary.

HISTORICAL SECTION.

The chief activity of the Historical Section during the year was the collection of data relating to the period of Sir William Denison's term of Governorship, 1847-1854. Owing to the difficulty in arriving at a correct view of several questions of the day, namely Transportation and Responsible Government, the preparation of the Section's evening before the Society took longer than was the case in previous years. However, the lecturettes on the period were given before the July meeting of the Society. A general outline of the period was given by Mr. W. F. D. Butler. A biographical sketch of Sir William Denison was read by Mr. J. Reynolds, whilst his scientific and engineering attainments were described by Mr. Clive Lord. Mr. G. W. Ife dealt with Denison's administration, and Mr. A. W. Courtney-Pratt read a paper on the Transportation question.

At the invitation of the Northern Branch of the Society, Messrs. Butler, Ife, and Lord repeated their lecturettes in Launceston on 23rd July. Opportunity was taken by their visit to confer with the members of the Society in Launceston regarding co-operation in historical research in the future. The results of this conference were gratifying, and will have an important bearing on future work.

During the next year it is hoped to proceed further with the work of the Section, devoting particular attention to the early years of responsible government. It is also intended to make a definite move towards the establishment of a repository for many of the valuable historical relics now in danger of being lost to the State.

J. REYNOLDS,
Hon. Secretary.

ROYAL SOCIETY OF TASMANIA.

RECEIPTS AND EXPENDITURE, 1926. GENERAL FUND.

RECEIPTS.

	£	s.	d.	£	s.	d.
Balance brought forward				2	17	0
Subscriptions—						
Arrears	6	6	0			
Current	190	1	0			
Advance	5	5	0			
				201	12	0
Miscellaneous				5	10	6
Sale of Publications				1	0	0
Government Grant				100	0	0
Rent of Room				11	8	0
Refund from M.A.M. Fund ..				2	14	0
				£325	1	6

EXPENDITURE.

	£	s.	d.	£	s.	d.
Salaries				36	0	0
Papers and Proceedings—						
1925 (Part)	157	6	4			
1926 (Part)	24	17	8			
				182	4	0
Printing, Notices of Meetings, Etc.				28	8	5
Library				20	3	6
Insurances				6	4	3
Light & Fuel				2	14	0
Petty Cash & Postages				15	17	4
Northern Branch				9	9	0
Miscellaneous				21	2	3
Cr. Balance				2	18	9
				£325	1	6

Audited: correct.

WALTER E. TAYLOR, F.F.I.A.,

Hon. Auditor.

4/2/27.

W. L. CROWTHER,

Hon. Treasurer.

CLIVE E. LORD,

Secretary.

ROYAL SOCIETY OF TASMANIA.

MORTON ALLPORT MEMORIAL FUND, 1926.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
Revenue, 1926	9	15	0	Refund to General Fund	2	14	0
Loan from R.M.J. Fund	4	7	0	Mathews's "Birds of Australia" (Part)	11	8	0
	£14	2	0		£14	2	0

Audited: correct.
WALTER E. TAYLOR, F.F.I.A.,
Hon. Auditor.

4/2/27.

W. L. CROWTHER,
Hon. Treasurer.
CLIVE E. LORD,
Secretary.

R. M. JOHNSTON MEMORIAL FUND, 1926.

RECEIPTS.	£	s.	d.	PAYMENTS.	£	s.	d.
Balance brought forward	25	11	10	Books purchased	17	13	0
Interest	14	12	0	Advance to M.A.M. Fund	4	7	0
				Balance	18	3	10
	£40	3	10		£40	3	10

Audited: correct.
WALTER E. TAYLOR, F.F.I.A.,
Hon. Auditor.

4/2/27.

W. L. CROWTHER,
Hon. Treasurer.
CLIVE E. LORD,
Secretary.

ROYAL SOCIETY OF TASMANIA.

NORTHERN BRANCH.

ANNUAL FINANCIAL STATEMENT FOR THE YEAR ENDING 31st DECEMBER, 1926.

	£	s.	d.		£	s.	d.
Balance on 31st December, 1925	21	13	11	Advertising	4	0	0
Interest	0	16	2	Printing	2	12	0
Share of Subscriptions	9	9	0	Postages	0	10	0
				Petty	0	15	0
				Balance in Bank	24	2	1
	£31	19	1		£31	19	1

Compiled from the books and accounts of the Royal Society of Tasmania (Northern Branch), and certified to be in accordance therewith.

J. E. HERITAGE,
Hon. Auditor.

R. STEWART PADMAN,
Hon. Sec. and Treasurer.

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Titles of Papers and New Genera and Species in Heavy Type.
Synonyms in *italics.*

R. M. JOHNSTON MEMORIAL.

The R. M. JOHNSTON MEMORIAL MEDAL.

List of Awards:

1923 Sir T. W. Edgeworth David, K.B.E., C.M.G., B.A., F.R.S., F.G.S.
1925 Professor F. Wood-Jones, M.B., B.S., M.R.C.S., L.R.C.P., D.Sc.

THE ROYAL SOCIETY
OF
TASMANIA

PAPERS & PROCEEDINGS

OF

THE ROYAL SOCIETY OF TASMANIA

FOR THE YEAR

1927

(With 28 Plates and 13 Text Figures)

ISSUED 29th FEBRUARY, 1928

PUBLISHED BY THE SOCIETY

The Tasmanian Museum, Argyle Street, Hobart

1928

Price : Ten Shillings

The responsibility of the statements and opinions in the following papers and discussions rests with the individual authors and speakers; the Society merely places them on record.

THE ROYAL SOCIETY OF TASMANIA

The Royal Society of Tasmania was founded on the 14th October, 1843, by His Excellency Sir John Eardley Eardley Wilmot, Lieutenant Governor of Van Diemen's Land, as "The Botanical and Horticultural Society of Van Diemen's Land." The Botanical Gardens in the Queen's Domain, near Hobart, were shortly afterwards placed under its management, and a grant of £400 a year towards their maintenance was made by the Government. In 1844, His Excellency announced to the Society that Her Majesty the Queen had signified her consent to become its patron; and that its designation should thenceforward be "The Royal Society of Van Diemen's Land for Horticulture, Botany, and the Advancement of Science."

In 1848 the Society established the Tasmanian Museum; and in 1849 it commenced the publication of its "Papers and Proceedings."

In 1854 the Legislative Council of Tasmania by "The Royal Society Act" made provision for vesting the property of the Society in trustees, and for other matters connected with the management of its affairs.

In 1855 the name of the Colony was changed to Tasmania, and the Society then became "The Royal Society of Tasmania for Horticulture, Botany, and the Advancement of Science."

In 1860 a piece of ground at the corner of Argyle and Macquarie streets, Hobart, was given by the Crown to the Society as a site for a Museum, and a grant of £3,000 was made for the erection of a building. The Society contributed £1,800 towards the cost, and the new Museum was finished in 1862.

In 1885 the Society gave back to the Crown the Botanical Gardens and the Museum, which, with the collections of the Museum, were vested in a body of trustees, of whom six are chosen from the Society. In consideration of the services it had rendered in the promotion of science, and in the formation and management of the Museum and Gardens, the right was reserved to the Society to have exclusive possession of sufficient and convenient rooms in the Museum, for the safe custody of its Library, and for its meetings, and for all other purposes connected with it.

In 1911 the Parliament of Tasmania, by "The Royal Society Act, 1911," created the Society a body corporate by the name of "The Royal Society of Tasmania," with perpetual succession.

The object of the Society is declared by its Rules to be "the advancement of knowledge."

His Majesty the King is Patron of the Society; and His Excellency the Governor of Tasmania is President.

THE ROYAL SOCIETY OF TASMANIA.

PAPERS AND PROCEEDINGS, 1927.

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CORRIGENDA

Page 187, line six—Early in 1850 *should read* Early in 1853.

Page 193—The Paragraph beginning "The coast line" *should come before* "(b) Stratigraphy" on page 192.

PAPERS

OF

THE ROYAL SOCIETY OF TASMANIA

1927

THE SOUTH COAST AND PORT DAVEY, TASMANIA,

By

CLIVE LORD, F.L.S.

(Director of the Tasmanian Museum).

(Plates I.-XII. and Five Text figures.)

(Read 11th April, 1927.)

INTRODUCTORY.

On 13th September, 1875, the late Hon. J. R. Scott read a paper (Scott, P. & P. Roy. Soc. Tas., 1875) before this Society describing Port Davey. The facts contained in Scott's paper are of value at the present time to those in search of information concerning the early history of the south-western portion of Tasmania, and as in years to come information may be desired concerning the condition of the south-western region half a century after Scott's account was written, the writer desires to place on record certain brief general observations concerning this interesting area.

The remarks made in the present instance are the outcome of two brief visits to this area. In January, 1926, I visited the South Coast as far as New Harbour in my own yacht *Telopea*. Again, in January, 1927, at the kind invitation of Mr. M. R. Freney, I visited the South Coast and Port Davey in the ketch *Lenna* (S. Purdon, Skipper). Messrs. P. B. Nye and F. Blake of the Mines Department were also members of this latter excursion.

During the recent visit to this area we landed at Cox Bight, and camped for some days before walking across and rejoining our boat at Port Davey. In the past tin mining

has been carried on at the Bight, the early history of which has been traced by the late W. H. Twelvetrees, Government Geologist (Report, December, 1906). At the present time this area, and the country in the vicinity, is being prospected under the direction of Mr. M. R. Freney, representing a mainland syndicate, which has secured certain concessions from the Government in order to investigate the possibilities of the country from the Bight to Port Davey.

At the time of Scott's visit Port Davey was occupied by pining gangs and others, although the earlier whaling settlement at Bramble Cove had served its purpose, and was falling into decay. To-day, Port Davey, except for an occasional prospector or fisherman, is uninhabited. It stands in that mountainous south-western portion—practically a fifth part of the island—which is uninhabited, and mapped but in outline.

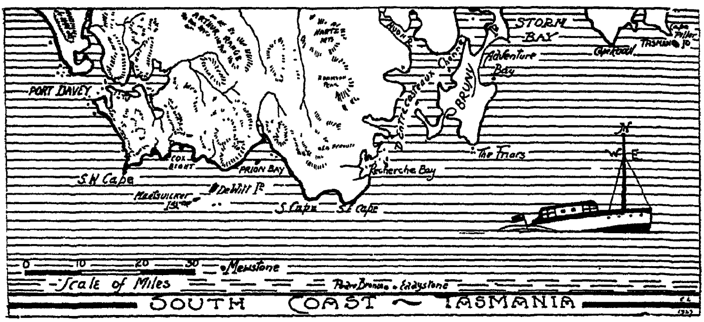


Fig. 1. Sketch of South Coast of Tasmania.

THE SOUTH COAST.

The South Coast from Whale Head to the South-West Cape, and practically the whole of the West Coast, has yet to be charted. Maps and charts at present in existence show but an outline, and that incorrectly. It is a matter of some difficulty for those without local knowledge to identify, with any degree of certainty, many of the prominent points and mountain peaks—particularly so towards the west, where there are so many unnamed capes and mountains. It is also a difficult matter to assist by means of sectional compass surveys, for there are so few definitely fixed points with which to connect. In the south it is difficult to see the trigonometrical station on Mount Counsel, and the station on South-West Cape is uncertain, although a search on the hills might

locate the old timber cairn which was erected here. The Government, if it cannot arrange for a detailed survey of the coast, might well provide for the exact position of South-East and South Capes, the point to the south of High Bluff, New Harbour Bluff, Telopea Point, and South-West Cape to be fixed in their true positions. If this were done it would prove of great assistance in mapping in the adjoining coast.

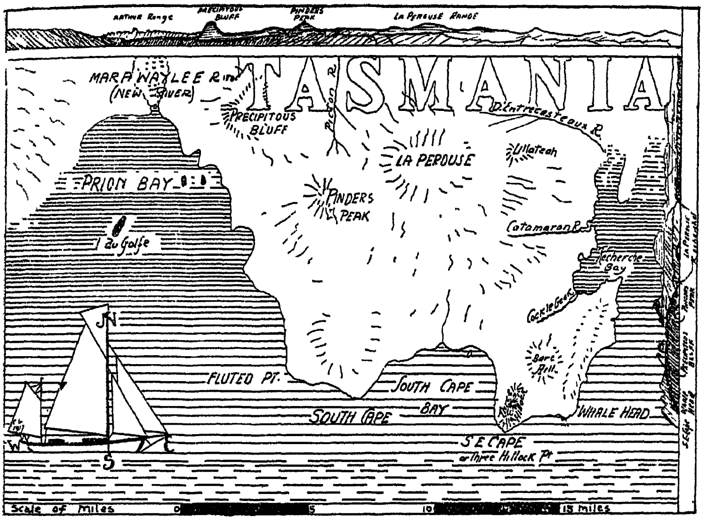


Fig. 2. Sketch map of vicinity of South Cape, Tasmania.

Off the coast, beyond South-East Cape, a picturesque view can be obtained on a clear day. A distinctive feature of the foreground is the massive diabase sill, nearly 1,000 feet high, at Fluted Point, a little to the west of South Cape. Above the coastal cliffs the mass of La Perouse (1) Range is seen with the sharp pointed cone of Pinder's Peak (2) rising to the west.

(1) The La Perouse Range was sketched in but not named in detail by several of the early explorers. In 1838, Lady Franklin bestowed the names "Mount King" and "Snow Ridge," but these have lapsed. On Strzelecki's map of 1845 La Perouse is shown as Mount Hershell. On Sprent's map of 1865 it appears as La Perouse. The name was given, without doubt, in memory of the French explorer La Perouse, who did not visit Tasmania, but in search of whom D'Entrecasteaux and others visited this vicinity.

(2) This cone-shaped hill was named Pinder's Peak by Commodore Hayes in 1793. Mr. Lewis referred to this mountain as "Leillateah" in his paper and maps of 1924, but local usage appears to favour that adopted by Mr. Twelvetrees in 1915; "Leillateah" being the pointed hill to the east of La Perouse. There appears to be every reason for Hayes's designation being brought into general use.

Farther west Precipitous Bluff stands out as a most distinctive landmark, which, when seen from the sea, reminds one of Barn Bluff in the north-west of the Island. The mountains then give place to the great valley of the Marawaylee River (New River), at the head of which, the wonderfully picturesque comb-like ridge of the Arthur Range is seen in the far distance, whilst on the western side of Prion Bay (3) a mountain range rises over 4,000 feet, and is spoken of as High Bluff or Iron-bound Bluff, but which surely deserves a more euphonious and distinctive name.

In Prion Bay there are small islands, the most distinctive of which is the Ile du Golfe (D'Entrecasteaux, 1792). On the north-east shore of the bay is a small inlet known as Rocky Boat Harbour, which provides indifferent shelter for small fishing vessels, but it may well be stated that the whole coastline from Recherche to Port Davey does not provide a really secure haven that can be availed of in all weathers. Several of the so-called "Boat Harbours" along this coast are no less than wreck traps.

To the south-west of the Ile du Golfe lie several islands and rocks, the exact positions and nomenclature of which have yet to be decided. Perhaps when the long-promised Admiralty survey of this coast is carried out, the matter will reach finality. The first record of this group is Tasman's chart (probably drafted by Visscher).

Various authorities have published charts and maps of this section of the coast, and during the course of the last century and a half names have wandered from place to place in a strange fashion. The group of islands off the coast (known to fishermen as "The Witches") are sometimes charted nowadays as the De Witt or Maetsuicker Islands, (4) and shown as two large islands and a number of rocks. The westernmost island (on which the present lighthouse is situated) is often named Needle Rock, but this designation belongs merely to a rock off its shores (for instance, see Arrowsmith's Map of 1822). The largest island—De Witt Island—(known to fishermen as "The Big Witch") is situated

(3) In order to define localities and on account of the number of Prions (*Pachyptila*) which breed on the Ile du Golfe, and are usually to be seen here in numbers, I have referred to this bay as Prion Bay. The River known as New River, and often confused with New Harbour and New Harbour Creek, I have given an alternative designation of Marawaylee River. It marks a great valley, and "Marawaylee" is the Tasmanian aboriginal name for "valley." (Milligan's Vocabulary, Tribes in the Vicinity of Recherche.)

(4) On modern charts spelt "Maatsuyker"; named by Tasman after Joan Maetsuicker, a member of the Council of India.

to the north-east of the group, and towards the mainland there stands out a very prominent bluff of white quartzite or conglomerate. This peak is well known as "Baldy." Between the large island and the mainland is a projecting rock known as "The Black Witch," whilst out to the south-east are "The Sisters," the easternmost of which provides a home for numerous seals (*Arctocephalus tasmanicus*, P. and P. Roy. Soc. Tas., 1925, p. 187). To the west is a large uncharted island ("The Flat Witch"), beyond which is "Maetsuicker Island" (Lighthouse Island), out from which several large rocks and reefs project, particularly on the north-west side.

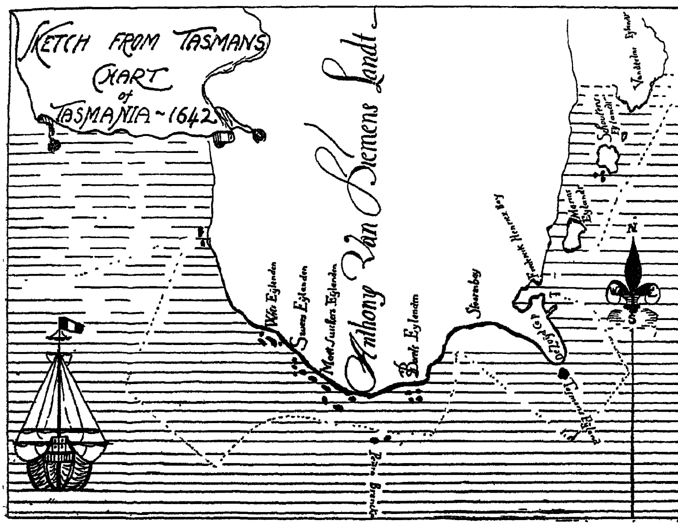


Fig. 3. Sketch based on Tasman's Chart, 1642.

Away to the south is the Mewstone, and just as the Maetsuicker Islands provide rookeries for thousands of Mutton Birds (*Puffinus tenuirostris*) so the lion-shaped rock far to the south provides breeding places for the Albatross (*Diomedea*) and other birds. Mention might also be made of the several rocky outcrops far to the south-east, "Pedra Branca" (named by Tasman), "Eddystone" (named by Cook). On the former rock the gannets (*Sula serrator*) breed. To the north-east of the latter is "The Sidmouth Rock," whilst early charts of Tasmania show a rock (Rurick Rock) far to the south of The Friars. This was reported as existing in 1822, but there appears to be no record of it on modern charts.

To the north of Maetsuicker Island is Cox Bight, so named from Captain Cox, who anchored there in 1789. This bay is protected on the west by the great quartzite mass of New Harbour Bluff (generally known as Cox Bluff). On the other side of the bluff is New Harbour, so called by Kelly when he visited it in December, 1815, but it was noted by Flinders in 1789 (Voy. Terr. Aust., Intro., p. CLXXIX.). Then follows Ketchem Bay (5) and a small cove known to fishermen as Amy Harbour. Beyond is Wilson Bight, after which South-West Cape projects boldly to sea, and the coast-line turns to the north. A bay (yet to be charted) on the west, some miles to the north of South-West Cape, is known as Window-pane Bay, on account of the glistening mica schist of the hillsides. Seen with the evening sun shining on these wide expanses of reflected light, the apt designation can be fully appreciated.

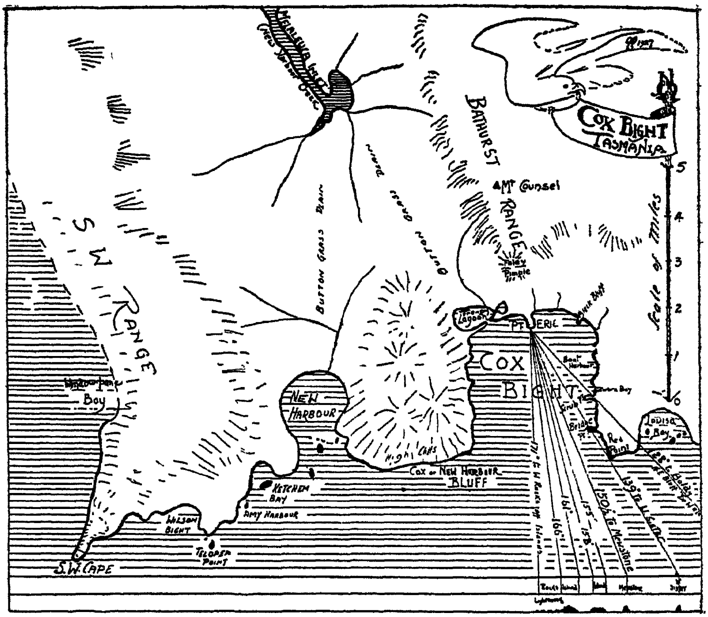


Fig. 4. Sketch map of vicinity of South-West Cape and Cox Bight. The bearings given from Pt. Eric are magnetic, and were obtained with an ordinary prismatic compass.

(5) "Ketchem"—Probably this nomenclature is a relic of the days when there were a number of Chinese encamped here gathering Mutton Fish (*Haliotis*), &c.

Beyond Ketchem Bay the land projects far beyond the position shown on most maps of this area. When standing on Bridge Point on the eastern side of Cox Bight, and looking over the conical rock at the foot of New Harbour Bluff, the point beyond Ketchem Bay shuts out South-West Cape—the high land behind the cape can be seen over this point which I have designated Telopea Point. (6)

COX BIGHT.

The inaccessible nature of the south-western portion of Tasmania readily offers the explanation for this area remaining untouched for so long. Even the coastlines have yet to be defined, as the contour of the shore, both on the Admiralty charts and Lands Department maps, is far from being correct. During our stay at Cox Bight Mr. Blake (of the Mines Department) and the writer made a rough compass survey of the Bight, and its correct outline is very different from that on any previously published map. The Mines Department has since published a map incorporating the result of our observations, and it may be mentioned that in addition to the names already existing the Department has added Freney Lagoon, Bridge Point, and White Point, the first having been given apparently as a mark of recognition of the work done by Mr. Freney in attempting to open up this area. The other two names were given to prominent points in the bay whilst Mr. Blake and the writer were making the survey above referred to.

Cox Bight is an interesting locality. It is open to the south, but on the west rises the massive quartzite mountain charted as New Harbour Bluff, but generally spoken of as Cox Bluff. To the north-west a long button-grass (*Mesomelæna sphærocephala*) plain runs through to a southern arm of Bathurst Harbour, the eastern section of Port Davey. This plain also branches towards New Harbour, and provides an easy means of access from the South Coast to Port Davey, as the greatest rise in the track across is well under one hundred feet.

To the north, on the eastern side of the plain, rises the massive quartzite Bathurst Range, on the southern end of which a granite outcrop appears. Farther east the country is a jumbled mass of hills and mountains, the prevalent formations being quartzite and mica schist. The terraces behind the sand dunes of the shore, which have been cut in several

(6) "Telopea" (seen from afar), also the generic name of the Red Waratah, which is plentiful in this locality; also the name of my own yacht, from which I first examined the point.

directions during the tin mining operations, offer a promising field for detailed investigation. Particular reference may well be made to the remains of trees (such as *Arthrotaxis*) which exist under the terraces. A general geological survey of the area in relation to the glacial movements of the successive Tasmanian ice ages would probably provide interesting data.

On the button-grass moorlands near Cox Bight bird life is plentiful. Owing to the absence of settlement with the attendant release of numbers of domestic cats, the bird life at present exists in its natural state, and the number of ground-frequenting birds met with is a marked feature.

The predominant species of the faunal region of the coastal moorlands are birds which in many other parts of the country have become rare. Such species as the Ground-Parrot (*Pezoporus wallicus*), the Emu Wren (*Stipiturus malachurus*), and the several Grass Birds (*Gramineus* and *Calamanthus*) are more common than in any other part of the island with which the writer is conversant. Another faunal feature of the plains is the smaller mammalian life. Runs can be seen in all directions, particularly of Swainson's Pouched Mouse (*Phascogale swainsoni*), the tracks of which are often carpeted with moss, the feather-like pathways running in thin lines for many yards. A common native rodent was the Long-tailed Rat (*Pseudomys higginsi*), and specimens of this species could always be secured around the camp at night.

Our stay at the bay (10th to 14th January, 1927) was merely long enough to allow a superficial examination of the surrounding country, but even this proved beyond doubt that the area well merits a detailed examination. Its fauna, flora, and geology are well worthy of study in detail.

Leaving Cox Bight by means of the overland track across the flat button-grass plain, a walk of six or seven miles brings one to a long projecting arm of Bathurst Harbour. This inlet is known as New Harbour Creek, but surely the designation of this, as well as certain other names in the vicinity, might well be changed for the following reasons.

Many miles to the east, away towards Precipitous Bluff, is the New River (proposed to alter to Marawaylee River). To the west, a few miles from South-West Cape, is New Harbour, whilst an arm of Port Davey is charted as New Harbour Creek. (7)

(7) On the evidence afforded by certain early charts it would appear that this southern arm was the original Spring River, a name now given to the river at the head of Long Bay (Joe Page Bay).

This prominent waterway is far more than a creek. I have suggested "Melaleuca" (Greek, *Melas*, black; *leucos*, white) as a suitable designation. The black-stained schists and the white quartzite are features of the banks. Furthermore, *Melaleuca* is the generic designation for swamp tea tree which grows in the vicinity of this stream. Should this area be developed on a large scale, Melaleuca Inlet, and possibly a canal-like extension of it to the South Coast, should provide an easy means of communication.

The name "New Harbour" could be left, as it is a relic of Kelly's nomenclature of 1815.

PORT DAVEY.

The existence of a harbour on the South-West Coast had been anticipated by explorers even before Kelly's voyage of 1815. For instance, when Bass and Flinders were sailing down the coast on the 11th December, 1789, during the famous voyage of the twenty-five ton sloop *Norfolk*, Flinders noted the northern point of the Port, and named it Point St. Vincent. In the evening, the breeze died away, and the sloop drifted towards an opening south of the point. Flinders states:—"This opening is indicated in the small chart which "accompanies the voyage of M. Marion, but does not appear "to have been seen by any other navigator."

In the morning it was found that the vessel had drifted ten miles to the south in spite of the calm which prevailed. This southerly set, and the lay of the country, caused Flinders to think that there must be a large river discharging at this place. His intended examination was prevented by a northerly breeze, and the actual discovery of the Port—as far as available records go—was not to eventuate for another quarter of a century.

The discovery of the Port is invariably credited to Captain Kelly in 1815, and the story of his boat voyage has become an epic. It is quite within the limits of possibility that the port had been visited by whalers before this, for it must be recalled that the old whalers went far afield in the early days, and left but few records. As an instance of this there is some evidence that a whaler was the first vessel through Bass Straits.

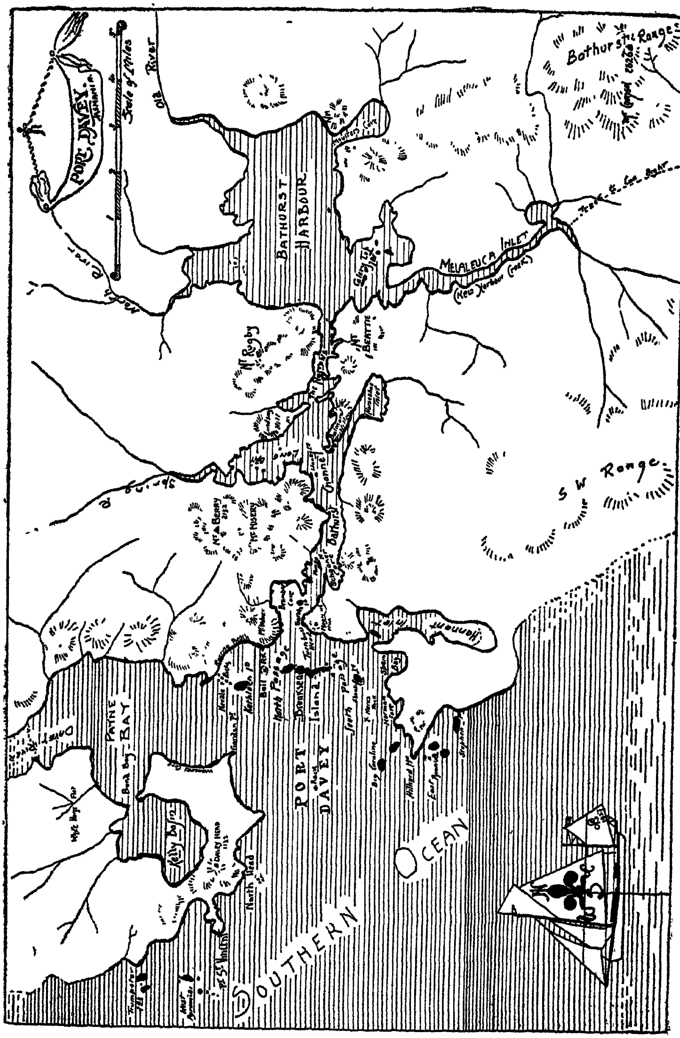


Fig. 5. Sketch of Port Davey.

Concerning Kelly's discovery of this western harbour the following is an extract taken from his account of the whale boat voyage round the island:—

> "at Daylight of the 17th [December 1815] Launched and Steered along Shore to the North West at Noon. Entered a large inlet Which was named Port Davey in Honor of the then Lieutenant governor of Van D. Land in the Evening we Hauled up on a Low Sandy point three Miles up the North Side of the Harbour Where we Remaind the Night, inside of a thick Scrub we Cleared away about two Rods" of Rich Ground and Sowed" a quantity of Garden Seeds" this was Named Garden Point in Consequence," We remained in the Harbour three Days the 18th 19th and 20th Sounding and Making a Sketch of its Extent the Eastern arm was Named Bathurst" Harbour in Honor of Lord Bathurst" Secretary for the Colonies" the Inner West Point of Port Davey was named Point Lucy" in Honour of Miss Davey" Daughter of the Lieutenant Governor, During our Stay in this place we Caught a Great quantity of Wild fowl" Black Swans Ducks teel and plenty of Ells and fish.
>
> On the 21st of December we took our Departure with a Light breze at East from Port Davey" and Steered along the Coast to the Northward." (Kelly's MSS., Royal Society's Library, Hobart.)

In May, 1832, James Backhouse visited Port Davey when on a voyage to Macquarie Harbour, the *Tamar* being forced to shelter for 17 days in Port Davey (Backhouse, *Narrative of a Visit to the Australian Colonies*, pp. 38-43). In his account mention is made of the great heaps of oyster shells near the Davey River, and Scott in his paper also refers to this.

The mounds of oyster shells may still be seen at Kelly's Basin—relics left by the aboriginal inhabitants of this region.

On the 17th May, 1842, the colonial schooner *Eliza*, whilst bringing Sir John and Lady Franklin back from their overland journey to the West Coast, called in at Port Davey. Lady Franklin named the rocky islet on the northern side of the entrance to the inner harbour, Kathleen Island, a name which it still retains, although her "Gunn Island" (after Ronald Campbell Gunn) has given place to "Breaksea" and her "Mavourneen" (for the rocky outcrop to the north) has been replaced on modern maps by "The Needles."

In the same way Lady Franklin's name of "Turnbull Island" has been replaced by "Sarah Island," and "Williamson Island" by "Little Woody Island," whilst the lofty rugged mountain now known as "Mount Rugby" was in the early days called "Bracondale."

The main topographical features of this region can be judged from the several text illustrations accompanying this paper. The fauna and flora have changed little since Scott wrote his description in 1875, with the exception, of course, that the Huon Pine (*Dacrydium franklinii*) has been practically cut out, whereas in 1875 Port Davey supplied Hobart with the greater bulk of its timber supplies of Huon Pine. (8)

Half a century ago there were fifty people residing in the vicinity of the Davey River, engaged in getting Huon Pine, whilst a piner named Joe Page had a small establishment at Spring River (Long or Joe Page Bay). (9)

To-day there are no permanent inhabitants in this western port, and the scattered pine stumps are the main relics of the earlier activity in this region. Scott mentions a settlement at Bramble Cove, and states that during his visit in 1875 the whalers' huts were unoccupied. Whaling was then declining, and to-day if one smashes through the belt of coastal scrub which has grown up, it is possible to find a few stray bricks and portions of large whale bones which are all that is left of the old settlement, whilst of the cemetery there is not a trace.

The possibility of coal in the neighbourhood is worthy of attention, and Scott records that on Pebbly Beach, near the entrance to the Davey River, were found several lumps of coal. During our recent visit several pieces which had been washed up were found. Through the kindness of Mr. Nye analysis of this coal has been made available, and the following letter should prove of interest:—

"Mines Department,
"Hobart, 24th March, 1927.

"Dear Sir,

"The following information about the pieces of coal "found in Port Davey may be of interest to you.

---

(8) These now come from Macquarie Harbour.

(9) A little antimony was mined some years ago on the eastern side of Long Bay.

"An analysis of several pieces of the coal gave the fol-
"lowing results:—

	Per Cent.
"Mcisture..	2.20
"Volatile Combustible Matter..	28.98
"Fixed Carbon..	60.52
"Ash	8.32
"Sulphur	0.87

"The rounded (water-worn) form of the pieces of coal "and the partly burnt coal or coke proves that some at least "is derived from ships sheltering in Port Davey or passing "the entrance thereof.

"The analysis proves the coal to be similar, among the "Tasmanian ones, to the better-grade coal of the Catamaran-"Strathblane district. It is also generally similar to that of "the South Coast of New South Wales.

"The similarity with the coals of Southern Tasmania is "suggestive, and it is possible that some of the coal may be "derived from outcropping seams (not yet located) in the "Southern part of the State.

"Yours faithfully,

"(Signed) P. B. NYE,

"Government Geologist.

"Clive Lord, Esq.,
"Tasmanian Museum,
"Hobart."

Scott further mentions that Doherty, an old piner, who had lived in the Port Davey region since 1849, stated that the lumps of coal had been washed up after southerly weather, as long as he could remember, though no trace of coal seams had been found on shore. Mention might also be made of the small lumps of bitumen found in this locality.

The reference made by early visitors concerning the relics left by the aborigines is of interest, and we found further traces during our recent excursion. The lack of secondary chipped stone implements from this area has often been commented upon, but the explanation is obvious. Owing to the quartzite and mica schists which are prevalent in this region, suitable stone was lacking, and roughly flaked quartzite pebbles were undoubtedly the main implements used.

Certain implements gathered from the middens and other places can be recognised immediately, but the average implement is of such a crude nature that it differs very slightly,

if at all, from the thousands of flakes and chips of quartzite which are met with everywhere in this region. On the shores of Schooner Cove, where a quartzite outcrop of a slightly chert-like nature occurs, the aborigines have endeavoured to make use of this stone, and the locality may well be described as an aboriginal quarry. My own observations in this regard were confirmed by Mr. P. B. Nye, Government Geologist, who also inspected the site. Although aboriginal quarries have been noted on the eastern and Midland areas of Tasmania, this is the first that I am aware of which has been observed amid the Pre-Cambrian rocks of the south-west.

FINAL NOTE.

The present unexplored nature of the south-west, and the limited time available in the foregoing instances to make observations, do not permit one to deal with any section in detail. Sufficient was observed, however, to anticipate that this great area, already noted for the rugged grandeur of its scenery, may also come into prominence for other reasons. Geological exploration may unfold mineral wealth which will lead to both the mainland and the islands off the coast offering chances for economic development, but such development should be carried out on a proper basis, and with due recognition of the lessons of the past. In the event of commercial activity in this region, it seems probable that the area will lose one of its most wonderful natural charms, the plentiful bird population of the button-grass plains and the waterways of the Harbour. Much as one will regret the diminution of *Pezoporus* (the Ground Parrot) and other such types, yet the economic progress of the State is a matter of far greater moment.

The dark coffee-coloured waters of the Port represent the outpourings from many hundreds of acres of button-grass plains. The brackish waters of the inner reaches are not favourable to sea fishes, and only a limited number of species are found within the harbour, although trumpeter, etc., which are plentiful on the outer coast, are taken occasionally in Bramble Cove.

In Bathurst Harbour Elephant Fish (*Callorhynchus*) were plentiful. These and other forms captured were all of exceptionally dark coloration owing to the effects of coffee-coloured waters which are so typical of this region.

It is said that Quinnat Salmon (*Onchorhynchus quinnat*) appear in Melaleuca Inlet, but we failed to prove this

during our recent visit. This species has been released in Tasmanian waters, but definite evidence of its successful introduction has yet to be obtained.

That the south-west offers scope for development cannot be denied. In the past it has seen two industries—whaling and pining—both of which have ceased owing to the extravagant methods pursued by those in charge of the industries concerned. With the object lesson afforded by those examples before us, the future exploitation of other industries may well be conducted in a far better manner.

The south-west region is to-day practically in its natural state. It is little altered from the days when Tasman's ships passed by nearly three centuries ago, the only items of change being fewer whales seen off the coast, the absence of the roving bands of aborigines, the cutting out of the slow-growing Huon Pine of the forests, and a depletion of the marsupial fauna. These and the traces of tin mining at Cox Bight are the main changes which man has wrought since the initial days of settlement. To-day there are prospects of the dawn of a new era of activity. With the advances which have been made concerning the importance of economic zoology, and other branches of nature, it is to be hoped that the future development of the area may be carried out with due regard to the scientific and economic importance of the proper conservation of our natural resources. If this is done, the future history of this wonderland of the west should be far brighter than its records of the last century.

EXPLANATION OF PLATES.

Plate I.

Fig. 1.—Pedra Branca (Tasman, 1642). A rocky islet off the South Coast of Tasmania.

Fig. 2.—Eddystone (Cook, 1777). A rock near Pedra Branca.

Plate II.

Fig. 3.—South-East Cape, or Three Hillock Point.

Fig. 4.—Prion Bay and Precipitous Bluff.

Plate III.

Fig. 5.—De Witt Island, The Sisters and The Mewstone in distance.

Fig. 6.—De Witt Island, showing the prominent N.E. Bluff known as "Baldy."

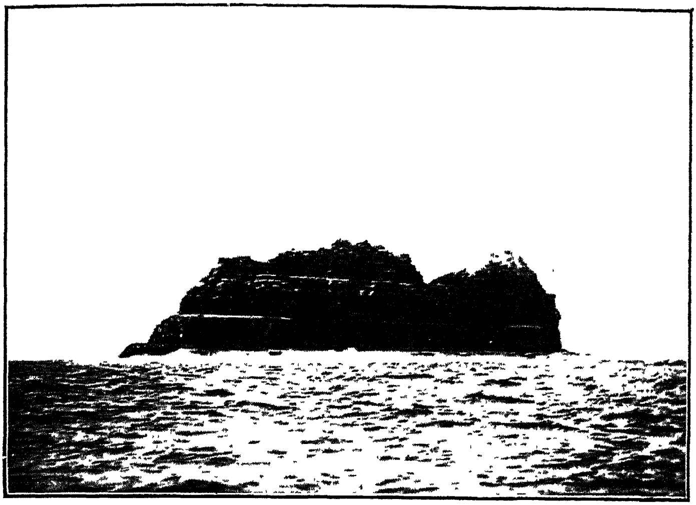


Fig. 1. Pedra Branca (Tasman, 1642). A rocky islet off the South Coast of Tasmania.

(R. Young, photo.)

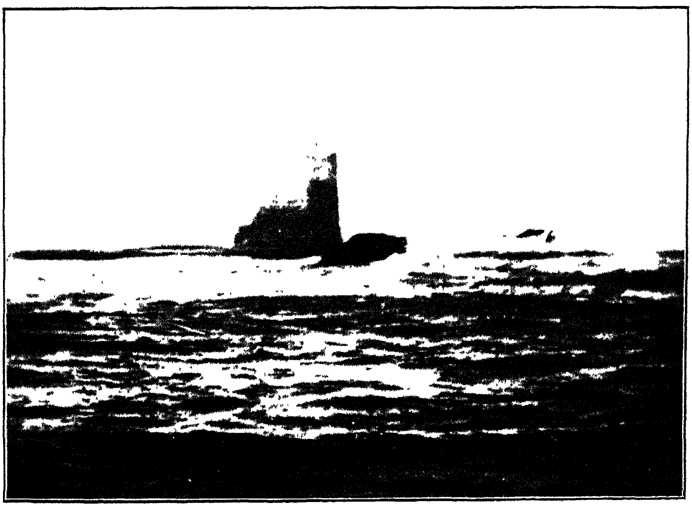


Fig. 2. Eddystone (Cook, 1777). A rock near Pedra Branca.

(R. Young, photo.)

[Published from photographs in the possession of the Royal Yacht Club of Tasmania, through courtesy of J. Boyes, Esq., Secretary R.Y.C.T.]

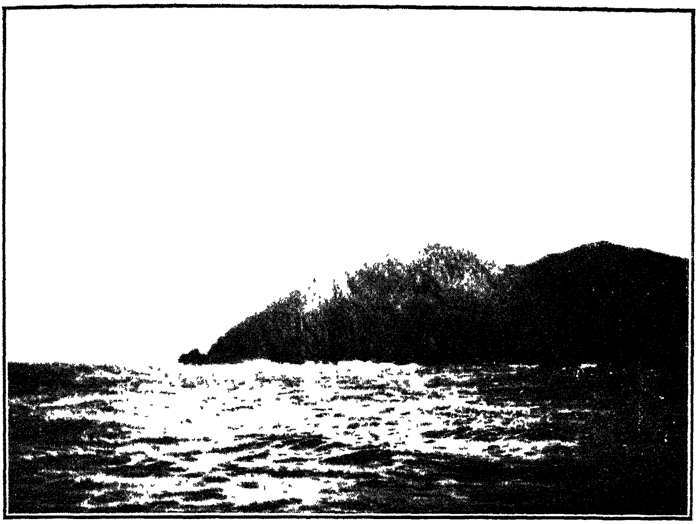


Fig. 3. South-East Cape, or Three Hillock Point.

(C. Lord, photo)

Fig. 4. Prion Bay and Precipitous Bluff. The valley of the Maraway-lee River (New River) can be seen to the west of the Bluff.

(C. Lord, photo)

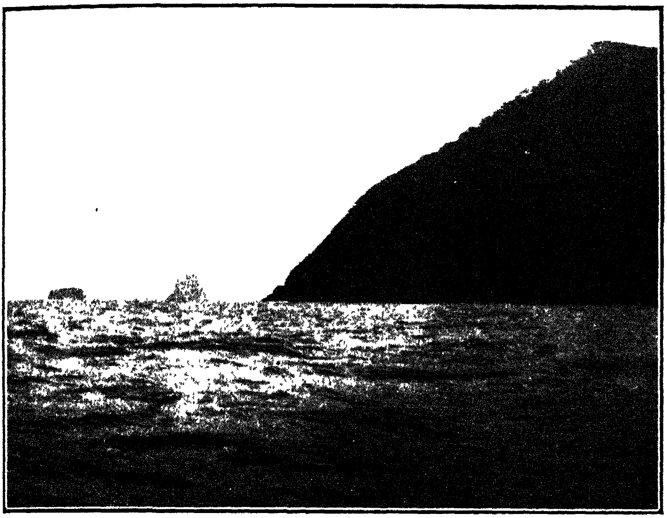


Fig. 5. De Witt Island. The Sisters and the Mewstone in distance.
(C. Lord, photo.)

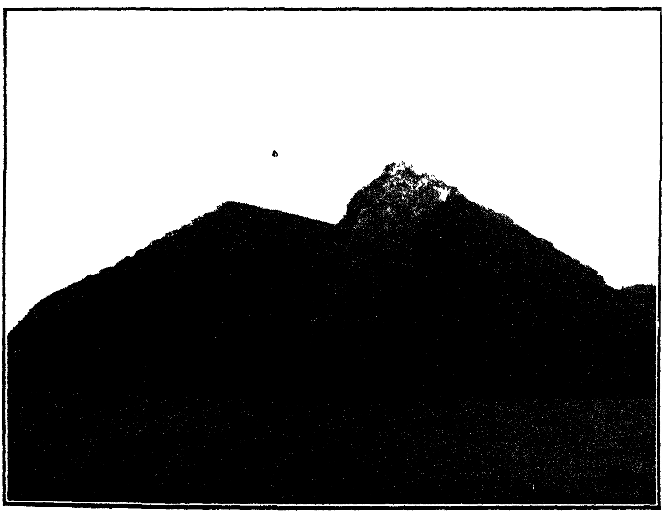


Fig. 6. De Witt Island, showing the prominent N.E. Bluff known as "Baldy."
(C. Lord, photo.)

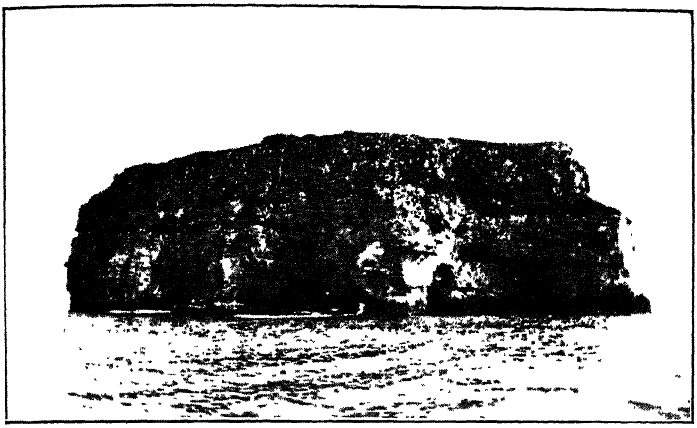


Fig. 7. East Sister (or Seal Rock).
(M. R. Freney, photo.)

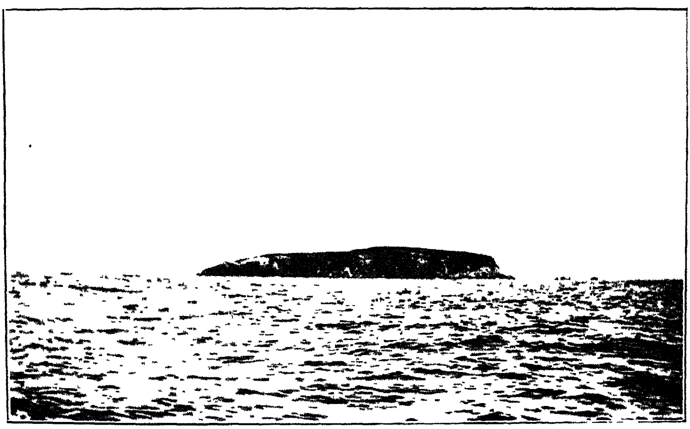


Fig. 8. Central Maetsuicker Island, which is not shown on the charts.
(M. R. Freney, photo.)

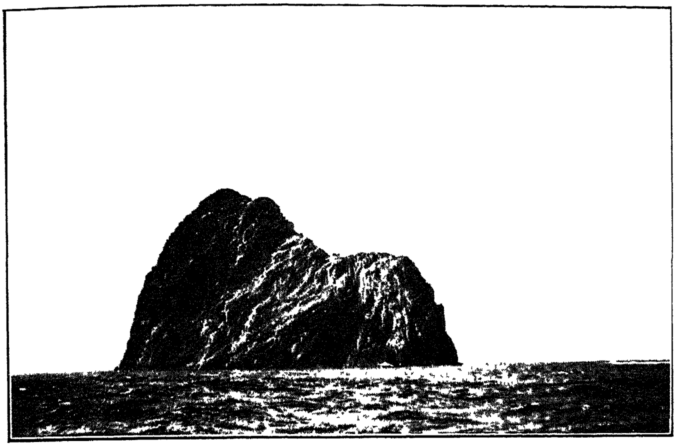


Fig. 9. The Mewstone—where the albatross breeds.

(Sir Herbert Nicholls, photo.)

Fig. 10. Ile du Golfe (D'Entrecasteaux, 1792), showing High or Iron-bound Bluff in distance.

(C. Lord, photo.)

Fig. 11. Eastern side of Cox Bight, showing old tin workings in foreground and De Witt Island in far distance over Red Point.

(C Lord, photo.)

Fig. 12. Western side of Cox Bight, showing tin workings in foreground, Point Eric, New Harbour (Cox) Bluff to the west.

(C. Lord, photo.)

Fig. 13. Track from Cox Bight to Port Davey. A view from southern end of Melaleuca Inlet (New Harbour Creek), showing northern end of New Harbour Bluff.

(C. Lord, photo.)

Fig. 14. Southern end of Melaleuca Inlet (New Harbour Creek), showing portion of the South-West Range in distance.

(C. Lord, photo.)

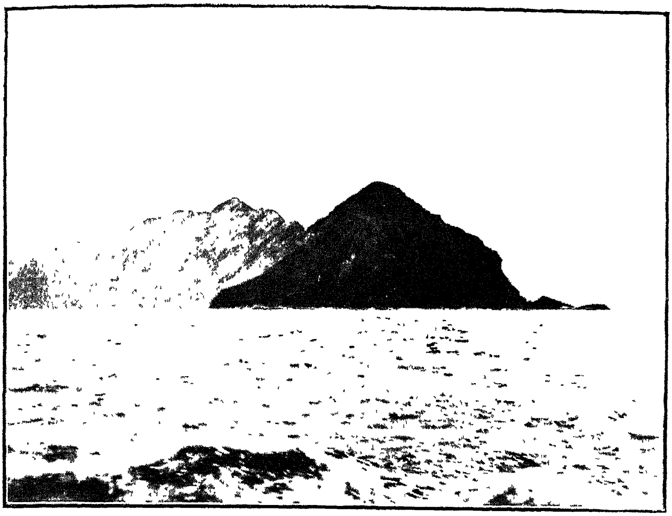


Fig. 15. South-West Cape, showing western side of Cape, and on the South Coast Telopea Point, with New Harbour Bluff in far distance over Point.

(C. Lord, photo.)

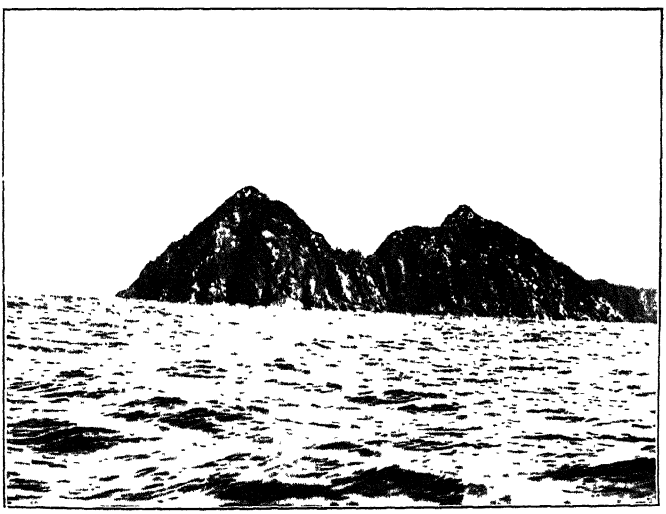


Fig. 16. South-West Cape, eastern side.

(C. Lord, photo.)

Fig. 17. Breaksea Island and the Carolines, etc., from Mt. Milner.
(C. Lord, photo.)

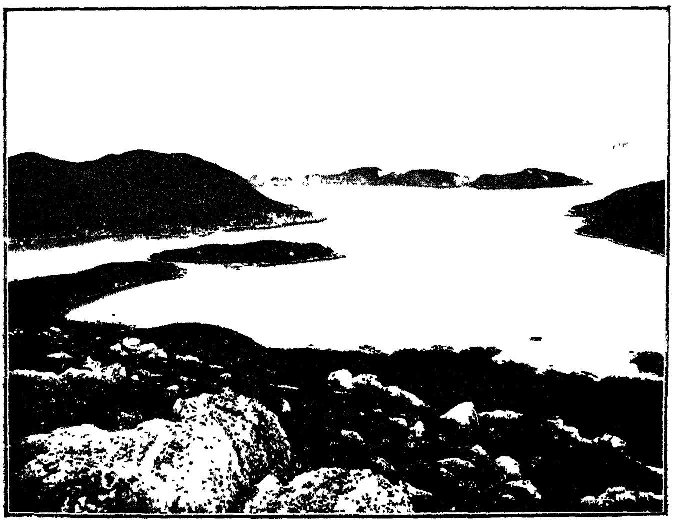


Fig. 18. Breaksea Island, Bramble Cove, etc., Port Davey. Bathurst Channel on the left.
(J. W. Beattie, photo.)

Fig. 19. Mt. Misery and portion of Bramble Cove, Port Davey.

(C. Lord, photo.)

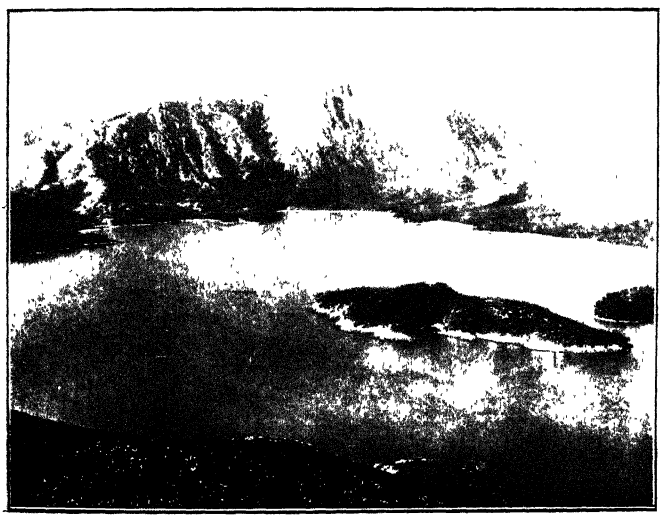


Fig. 20. Mt. Berry, Port Davey.

(J. W. Beattie, photo.)

Fig. 21. Bathurst Channel, Port Davey.

(J. W. Beattie, photo.)

Fig. 22. Bramble Cove and Bathurst Channel, Port Davey.

(C. Lord, photo.)

Fig. 23. Mt. Rugby from the slopes of Mt. Beattie.
(C. Lord, photo.)

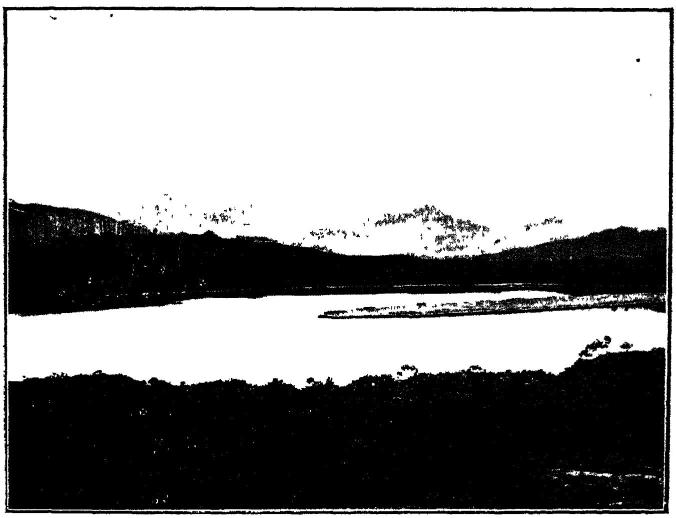


Fig. 24. Davey River and the De Witt Range, Port Davey.
(J. W. Beattie, photo.)

EXISTING TASMANIAN MARSUPIALS.

By

CLIVE LORD, F.L.S.,

Director of the Tasmanian Museum.

Within the last few years considerable attention has been directed to the present state of the Australasian marsupial fauna. The meetings held during the recent scientific congresses in Australia have served to stress the importance of our native animals and the need for a better system of conservation, for, with the advance of settlement, many forms of animal life are being reduced in numbers to a very considerable extent. This is particularly noticeable in the Australian zoo-geographical province.

Our fauna consists, to a very large extent, of archaic types, which, when brought into sudden contact with more advanced forms, rapidly decline. In addition to man, in the ordinary process of settlement, the native fauna has to contend with numerous introduced species, which latter almost invariably tend to displace the indigenous forms previously existing.

In view of the difficulty experienced in tracing the life histories and distribution of extinct and rare forms, a brief review of the present position of the Tasmanian marsupials may be useful not only for its present interest, but as a source of reference to workers in future years who may endeavour to trace the extent and distribution of our fauna, many forms of which will undoubtedly become rare if not extinct.

Since the settlement of Tasmania in 1803 the aborigines have vanished, the Tasmanian Emu has become extinct, and certain other forms greatly reduced. As is well known, several American expeditions have recently collected in Australia, and these observers have drawn attention to the lack of any systematic work as regards the distribution of the mammals of Australia (for instance Hoy, *Journal of Mammalogy*, Vol. 4, No. 3, p. 166). This is not as it should

be, and Australian Zoologists might well consider plans whereby at least an outline biological survey of our indigenous fauna could be attempted. In this instance it is desired to give a brief résumé of the Tasmanian *Marsupialia* as at present existing.

Macropus giganteus, var. *tasmaniensis* (Forester Kangaroo). The Forester Kangaroo formerly roamed over the greater part of Tasmania where conditions were suitable. It frequents, as a rule, more open country than *M. ruficollis*, and this fact, together with its larger size, is undoubtedly responsible for its decline. At the present time this species is met with only in a few localities in Tasmania. In some instances, the owners of large estates have taken an interest in the animal, and it is owing to the protection thus received that groups of this species exist to-day in certain places in the island.

In other parts where there are scattered mobs, such as in the extreme North-East of Tasmania, the advance of settlement is having its effect, for although the species is totally protected by law, the fact must be recognised that in the more distant country districts it is a matter of extreme difficulty to enforce the game laws.

Although very much reduced in numbers the Forester Kangaroo does not appear to be in any immediate danger of extinction, particularly if the landowners who have protected it in the past continue to recognise the variety as one worthy of being retained. Again, the species will probably be bred in local zoological gardens, and there is the still further possibility of this and other species being bred on a large scale and made an item of great economic importance to the State.

Macropus ruficollis, var. *bennettii* (Bennett's Wallaby). Commonly called the Kangaroo in Tasmania. This species is evenly distributed over the island except in certain of the more settled districts from which it has now vanished. In the North-West and South-West it is common. Extensive trapping takes place each open season, and the official returns* show large totals of skins upon which royalty has been paid.

*For returns of skins, etc., see Annual Reports of Police Department of Tasmania. A résumé of several years is given in Appendices 1 and 2 of the present paper.

Macropus billardieri (Rufous or Scrub Wallaby). The Scrub Wallaby frequents the denser bush and patches of scrub bordering the creeks and plains. It is evenly distributed and is plentiful in certain districts remote from settlement; but close to the settled areas its history is the same as the larger forms.

Bettongia cuniculus (Tasmanian Bettong or "Rat Kangaroo"). This species is still comparatively common, being well distributed throughout Tasmania.

Potorous tridactylus (Rat Kangaroo or "Wallaby Rat."), Common in many localities and evenly distributed in most localities suited to its habits. This and the preceding species are not trapped for commercial purposes as are the larger members of the *Macropodidæ*, but they have to contend with many enemies consequent upon the advance of settlement.

Dromicia lepida (Lesser Dormouse Phalanger). Being of small size and living in the hollows of eucalypts and other such trees, this species is captured more by accident than by design. It appears to be evenly distributed, and is probably far more plentiful than is generally supposed.

Dromicia nana (Dormouse Phalanger). The remarks made concerning the previous form (*D. lepida*) are also applicable to this species.

Petaurus breviceps (Lesser Flying Phalanger). It is generally stated that this species was introduced into Tasmania from Victoria (Gould, *Mammals of Australia*, Vol. 1, p. 25 and p. 28). If such is correct the animal has spread throughout the island, as specimens have been secured in most districts—even from the extreme South.

Pseudochirus cooki (Ring-tailed Phalanger). The Ring-tailed Phalanger is to be found in practically every part of Tasmania suitable to its habits. In certain districts it is exceedingly plentiful, but extra safeguards may be needed in the near future, as since the introduction of acetylene flare lamps, this and the following species are greatly reduced in numbers during the hunting season.

Trichosurus vulpecula, var. *fuliginosus* (Tasmanian or Brush Phalanger). Whilst not as common as *P. cooki*, the Brush Phalanger, which may be either black or grey in colour, is found in most parts of Tasmania. It is absent in certain areas, for instance Bruny Island. In the South-West of Tasmania it does not occur west of the Marawaylee (or New) River, but is present north of Rocky Point on the

West Coast. Owing to the high value placed on its fur the remarks made regarding the previous species apply with added force in the present instance.

Phascolomys tasmaniensis (Tasmanian Wombat). The Wombat is distributed throughout Tasmania, and even manages to exist in bush areas close to settled localities. In the Western highlands the wombat is exceedingly numerous in places. Its pelt is not considered of commercial importance. This is largely owing to the coarseness of the fur and the difficulty of skinning the animal. Trappers, however, destroy large numbers of wombats on account of the damage which they do to their snares. The Flinders Island wombat has been introduced, and there is a small colony of the Flinders Island form at Eddystone Point, North-East Tasmania. They were liberated here by the lighthouse-keepers.

Perameles obesula (Short-nosed Bandicoot) and *Perameles gunni* (Tasmanian Striped Bandicoot) are to be met with throughout the island. The former appears to be the more common and evenly distributed form.

Thylacinus cynocephalus (Tasmanian Marsupial Wolf). When John Gould described this animal (*The Mammals of Australia*, Vol. 1, p. 53) he wrote:—"When the comparatively "small island of Tasmania becomes more densely populated "and its primitive forests are intersected with roads from the "Eastern to the Western Coast, the numbers of this singular "animal will speedily diminish. Extermination will have "its full sway and it will then, like the wolf in England and "Scotland, be recorded as an animal of the past."

Such was undoubtedly a true forecast, for the animal is confined practically to the rugged western portion of the island. From the more settled districts it has long since disappeared, and even in the more distant sheep runs it has been trapped out, owing to the destruction which it caused among the flocks. It is now also being killed out even in the rugged and more inaccessible parts of the country, which tends to reduce still further the remnants of this species. The explanation of this is that the Thylacine interferes with the trappers' snares. As a result, a powerful "springer" snare is set often in the vicinity of their "skinning yards," which are situated every quarter of a mile or so along the lines of snares. Thylacines or other animals caught in these powerful snares are, as a rule, too severely injured to be kept alive as specimens for zoological gardens, even if the trappers would take the trouble to bring them in. The

extended trapping of recent years will tend, therefore, to restrict the Thylacine to the most rugged and unsettled portions of the West of the island. Here it may survive as a living species for years to come, but its eventual doom seems apparent unless such attempts as are being made at present by Mr. A. R. Reid (Curator of the Beaumaris Zoo, Hobart) to breed these animals in captivity are successful. Should success be attained in this direction, a most interesting species will be retained for a much longer period than would otherwise be the case.

It is doubtful if the shy animal will breed within the confines of a Zoo, and it would be in the interests of science if a reserve could be set aside and netted in in order to prevent total extermination. Such a reserve would only need to be a few acres in extent in suitable country, but the question of supervision and feeding is important. If funds were available an area in the National Park might well be considered for such a reserve.

As the animal is found in a living state, only in Tasmania, a few general remarks concerning its habits may well be added. The Thylacine, which is a timid animal, hunts chiefly at night, but it may be met with occasionally in the day time. Generally it hunts alone, but a family pack of four or five has been noted. It covers a large area of ground in its hunting excursions, usually scouring the plains at night and returning during the day to a cave amid the rocks in the hills or amid the thick timber of the gullies. During the breeding season a male Thylacine has even been known to follow the same route across many miles of country, and one particular animal used to regularly leave a trail of slaughtered sheep along the same line of march each year, but he was trapped eventually. If a Thylacine kills a sheep it will usually only suck the blood, and may also take a little of the kidney fat.

Usually four young are reared at a time. They have very pronounced stripes, and a distinct terminal crest on the tail. It is often stated that a Thylacine can be grasped by the tail in the same manner as *Sarcophilus*, but this is by no means a general rule, as those who have had to handle the animals know to their cost.

As regards osteological details, the skull of a Thylacine, to the casual observer, appears very like that of a dog, but the expanded zygoma, contracted parietals, incurved lower jaw, and the eight upper incisors and molars, serve, among

other things, to immediately distinguish the marsupial wolf. Another interesting feature is that the epipubic bones of *Thylacinus* are not ossified, but are represented by cartilaginous members.

Sarcophilus harrisi (Tasmanian Devil). Of much smaller size but of fierce disposition, the Tasmanian Devil will probably survive for many years. Its hardy nature both in captivity and in its wild state cause one to wonder how it came about that this species became extinct on the mainland within comparatively recent geological times. It cannot be considered a pleasant animal to have much to do with, and numbers are killed by trappers in the course of their work. In the rougher sections of the country this species exists in fair numbers and there is every prospect of it remaining an inhabitant of such places for years to come.

One or more Tasmanian Devils will often follow a Thylacine on its hunting excursions. The Thylacine will kill a wallaby or other small animal, select a few choice morsels, and pass on. The Devils will carry on the feast and consume the remnants, bones and all. It would be difficult to find an animal with a more powerful jaw than *Sarcophilus;* its gripping and breaking powers are astonishing considering its size.

Dasyurus maculatus (Tiger Cat). The enemy of the settler's chickens, it is only natural that this species should be reduced in numbers, especially in the settled districts. Even so, this hardly accounts for the scarcity of this species in the more Southern Tasmanian localities in the last few years. In the North-West the species is still fairly common.

Dasyurus viverrinus (Native Cat). Of smaller size and not of quite such a destructive nature as the former species, the native cat still exists in fair numbers in even the more settled districts.

Phascologale swainsoni (Swainson's Pouched Mouse). This interesting animal appears to be fairly evenly distributed throughout the island; in the Cox Bight and Port Davey region it is common.

Phascologale minima (Little Pouched Mouse). Further research is needed in regard to this and the following species—

Sminthopsis leucopus (White-footed Pouched Mouse). These are small forms not often captured, and it would be a matter of some difficulty to define their distribution and

numbers. In a general way, however, it is often found upon investigation that such small forms as these are far more numerous and more generally distributed throughout the country than is generally supposed.

General. Generally speaking, it may be said that as far as the smaller marsupials are concerned, they still exist in fair numbers in the less settled districts. Certain larger forms, however, such as the Thylacine (*T. cyanocephalus*) and the Forester Kangaroo (*M. g. tasmaniensis*) are sadly reduced in numbers and may be in danger of extinction unless protection is afforded or some other means found of conserving the continuity of such species. The National Park will assist in this direction, and several sanctuaries have been proclaimed in addition. Certain of these are of little value, however, for they are in isolated positions and lack a permanent guardian. A sanctuary can never claim to be such unless a resident ranger is placed in charge of the area. In this respect the Tasmanian National Park at Mount Field (38,500 acres) may be mentioned, as through the enthusiasm of the ranger (Mr. W. A. Belcher) the area is a sanctuary in effect as well as in name, and such species as *M. ruficollis* and *M. billardieri* have increased considerably in recent years. Our animals appear quick to appreciate the areas in which they are not disturbed, and in this connection attention may be drawn to the fact that the Brush Opossums (*T. vulpecula*) inhabiting the bush in the vicinity of the huts at Lake Fenton have become so tame that they will even enter the huts during the evening and allow visitors to feed them.

Another factor which would tend to the conservation of our fauna if it were recognised more fully is its great economic importance. At present our methods in regard to hunting and trapping are crude and wasteful. A country depends for its progress on production, which naturally divides into five main divisions, the first being hunting. A more business-like method of dealing with the produce of this division would not only assist the State in regard to revenue, but would tend to the better conservation of our wild life.

Tasmania's topographical formation supplies extra reasons for the consideration of some such scheme, for, owing to its peculiar hilly character and masses of rugged mountainous country, a large percentage of its acreage is quite useless for agricultural or other purposes. If mineral wealth is not found in these areas they will remain unproductive for many years to come unless other plans are carried out.

It would appear that such areas could be turned to good account by the formation of game reserves and by conducting trapping, etc., on business lines, with due consideration to conservation and a limited yearly return of skins, etc. Present methods are wasteful and constitute a source of economic loss as well as tending to the ultimate extinction of the larger marsupials.

The main difficulty in dealing with questions in relation to our fauna is that they are subject to political considerations, and the annual return in licence fees is given more consideration than the capital sum. In short, the total capital value of our fauna appears nowhere on the Treasury books as such and is disregarded. Not only is the yearly interest on this capital spent, but the capital sum is itself being seriously depleted. On economic grounds alone, apart from purely scientific or sentimental reasons, our native fauna and particularly the marsupial section, may well claim considerably more attention in the future than has been bestowed upon it in the past. We, as Australians, have been placed in charge of a wonderful heritage, and it rests with us to respond to the trusteeship which has been granted us.

APPENDIX 1.

The following gives the returns from Wallaby and Phalanger hunting for the years 1923 to 1926 inclusive:—

		(Bennett's Wallaby) *M. ruficollis*	(Scrub Wallaby) *M. billardieri*	(Brush "Opossum") *T. vulpecula*	(Ringtail "Opossum") *P. cooki*
1923	..	146,236	201,365	105,968	587,179
1924	..	59,448	86,393	45,978	273,421
1925	..	75,979	121,245	60,212	596,526
1926	..	66,114	94,531	49,737	634,620

APPENDIX 2.

Fees collected by Government in 1923 to 1926 in relation to marsupials:—

		Licence Fees.	Royalties.
1923	..	£4,119	£15,878
1924	..	£1,974	£6,928
1925	..	£2,500	£11,148
1926	..	£2,402	£10,382

NOTES ON A SERIES OF "POUNDERS" FROM CERTAIN LOCALITIES OF THE WEST COAST OF TASMANIA.

By

R. W. LEGGE, Cullenswood.

Plates XIII., XIV.

(Read 13th June, 1927.)

All students and collectors of Tasmanian stone implements are more or less familiar with the type generally known as "Pounder" or hammer-stone, which occurs on most of the ancient native camping grounds along the East Coast, the estuary of the river Derwent, and in the wind-blown sand pits of the Midlands.

This type is fairly well represented in the collection at the Tasmanian Museum, and the writer has been able to secure a wide range of specimens for the Cullenswood collection, including the distinct disc-like type, varying in diameter, from 3ins. to 5½ins., and averaging 1in. in thickness, having the periphery more or less worn to a flat surface, and the ovate or true hammer-stone chosen from the beaches and beds of streams for their handy shape and suitability for the delivery of hard fracturing blows, evidence of such usage being plainly marked at their extremities.

There is also another type, typical of the East Coast camps in particular. This is distinguished by its somewhat elongated shape, best likened to that of a small Banana, or perhaps better, to the white Passion-fruit of temperate climes.

This last-mentioned type was probably used for breaking open the shells of the Green Whelk (*Turbo undulatus*) which figured so largely as an article of food with the natives whilst they were roaming the coast-line.

Having made a close study of the foregoing, ably assisted in their collection by my wife and fellow-student, it came as a considerable, if not to say very pleasant surprise to us, when, during our late Xmas and New Year holidays, we

made our first visit to the great native feeding-grounds along the shores of the Northern part of the West Coast, and soon discovered what was to us, at least, a totally new and distinctive type of "Pounder," lying, in considerable numbers around and upon the great "kitchen middens" of this, at one time, comparatively thickly populated locality. It is quite evident, even to the casual observer, that these implements must have been in constant, if not in daily use by the natives living at these great camps, for, in the majority, those examined shew traces of much wear, and many split halves occur, the pebbles having finally succumbed after long and constant use.

As the source of supply must always be considered in dealing with our Stone-culture, it would be well to state at this point, that the occurrence of these remarkable miniature "pounders" in such quantities at the Bluff Point middens, and in a lesser degree, at those existing both to the Northward and Southward, over a limited area, may be readily accounted for in the presence, at the former, of large beds of white waterworn pebbles of Quartzite, or wonderful symmetry and smoothness, which have been cast up by the sea on the shores of some small coves at this locality, and of which no further traces were seen, during a later examination of the coast as far South as Sandy Cape, and to the North, to a point 3 miles above Mt. Cameron West.

These beds gave the natives of this locality, a ready source of supply from which to select the pebbles suitable both for these "pounders," and for their throwing stones, of which latter too, one may see countless numbers lying about the slopes of the mounds, and in one instance the writer came upon a little cache of 15 of these pebbles lying in a little heap, high up on the side of the great camping mound at the Bluff.

Now, the first thought that comes to the observer, after picking up several of these remarkable little implements, is "What were they used for? What was it that caused them to be come so well, and evenly worn ?" For that they owe their condition to regular usage, cannot for one moment be doubted.

In attempting to give anything like an adequate description of these most interesting implements, it may be mentioned here that, with very few exceptions, all those which have

come under the writer's notice, are composed of a white quartzite; a few were found of diminutive size, of a black stone, possibly diorite, and the best of the miniature specimens are of this stone.

These "pounders" may be divided into two classes, and for purposes of description will be termed the Ovate and the Disc-like.

Taking the Ovate first, 17 specimens of this class have been selected for description, and are illustrated on Plate XIII. to give some idea of their character and the amount of wear which they have sustained. These examples, which form a good average group representative of the class, range in dimensions from 61mm. long x 53mm. wide x 45 mm. thick in the largest, to 40mm. long x 35mm. wide x 25mm. thick in the smallest. Larger specimens have been examined, showing much the same characteristics, but fall more into a class by themselves.

It will be seen that, with one exception, the individuals in this class as illustrated, show signs of wear at the extremities only, and the deformation at these points is such as to suggest that the blows causing it, were of a light tapping nature.

The second, or Disc-like class are the more interesting of the two, as they have been chosen, almost without exception from pebbles of circular form. The 27 specimens shewn on Plate XIV. will serve to illustrate the class, although the worn edges do not show to advantage.

This group ranges in dimensions from 55mm. in diameter x 26mm. in thickness, down to 22mm. in diameter x 13mm., whilst an odd example will measure 35mm. in width with a diameter of 43mm. The periphery having been worn down so much as to show a surface 21mm. wide.

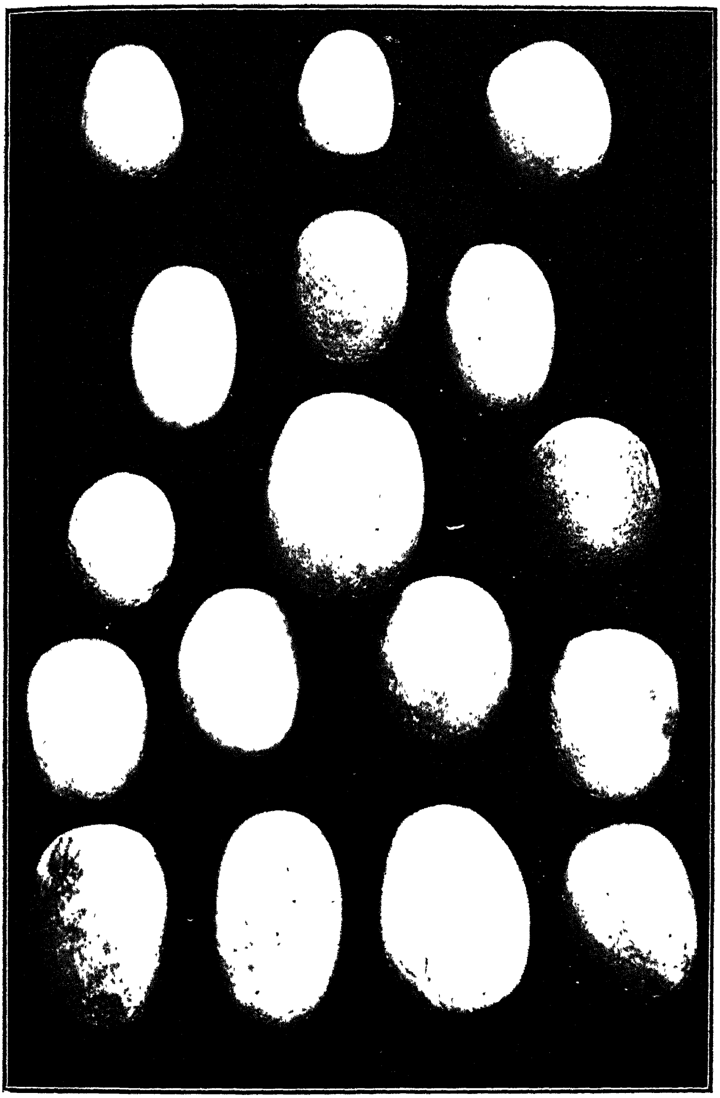
Several halves of this Disc-like type were found, the pebbles having evidently parted asunder after long usage, and on one camp, notably at the Arthur River, the two halves of the one pounder were found lying close together.

The student of Tasmanian Stone-Culture cannot examine these so-called "Pounders" without speculating as to what was their usage. That they were in constant use is

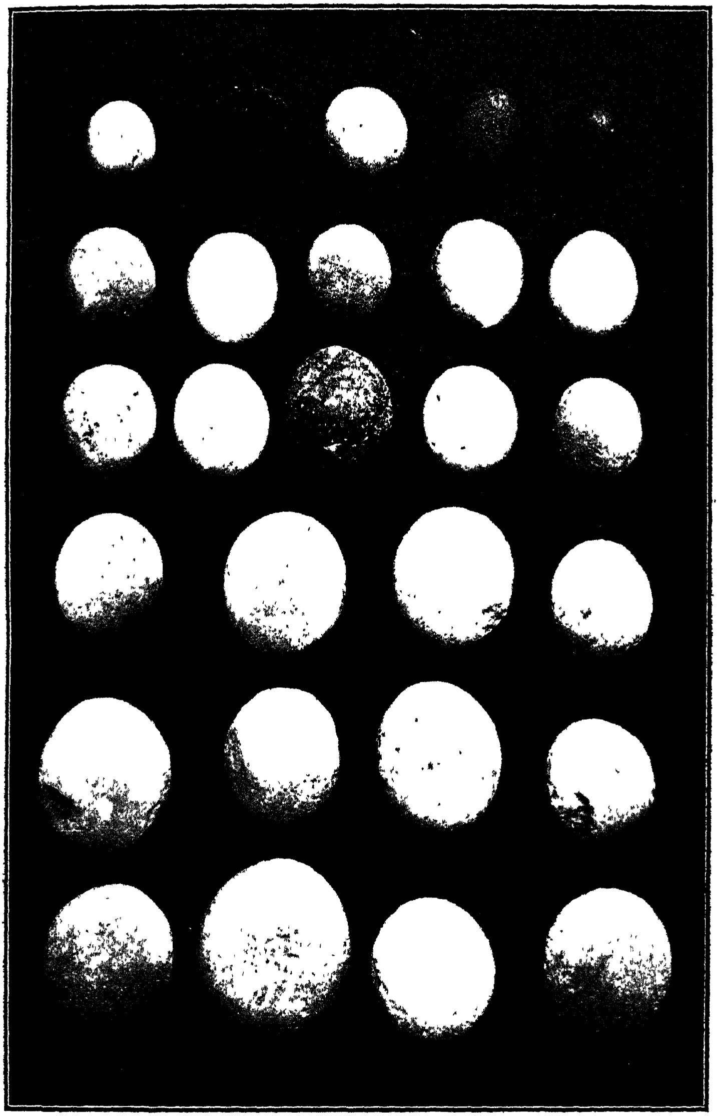
almost certain, and after careful study of the two aforementioned types and of the sites from which they were obtained, the writer finds it difficult to associate them, with anything but food supply, and the conclusion has been finally arrived at that these implements were used by adults and young alike, for the express purpose of breaking the bones of Kangaroo, Opossum, and other marsupials, in order to extract therefrom the marrow which would have provided a welcome tit-bit on the bill of fare. In a lesser degree too, they may have used them for opening, or rather breaking the convolutions of the Whelk shells so as to obtain whatever portions of the contents they could not draw out with a sharp piece of stick or possibly of bone. In this latter hypothesis, however, one is brought to an abrupt stop when one finds heaps of these shells on some of the middens, which are quite intact!

The theory that this class of implement was used for the purpose of flaking or secondary chipping of the scrapers, points, and other tools, does not appeal to the writer as being sound, as the worn surfaces which they exhibit are not likely to have been produced by the glancing blows necessary for this work.

Finally, it is a lamentable fact that conjecture must ever enter largely into the study of the probable usages of the various stone implements used by our vanished race, and their ruthless and rapid extinction will always leave those who have endeavoured to solve the many problems which they have left, with feelings of deep regret that so little was done while yet there was time, and opportunity remained, to make fuller study and investigation of the habits and customs of one of the most remarkable races of mankind.



Tasmanian Stone Implements



Tasmanian Stone Implements.

A REVISION OF THE LEPIDOPTERA OF TASMANIA.

Part II.

By

A. JEFFERIS TURNER, M.D., F.E.S., Brisbane.

(Read 8th August, 1927.)

It is necessary to make a few corrections and additions to Part I. *Chlorocoma assimilis*, Luc., was included owing to a misidentification, which I regret. It must be deleted; and so must *Ecpatites callipolia*, Turn., which is a synonym of *Mictodoca toxeuta*, Meyr. An examination of specimens in the Littler collection shows that a few species from Broken Hill and South Australia received by him have by some mistake had Tasmanian labels affixed. I have, of course, not included these, and for the same reasons I think *Microdes typhopa*, Low., and *Sandava xylistis*, Swin., should also be deleted. The generic name *Pauroneura* was used earlier by me in the *Gelechiadæ*, I therefore propose to substitute the name *Pauridioneura* for the *Hyponomeutid* genus. The additions will be found below.

NOTODONTOIDEA.

LARENTIADÆ.

Omit *Euphyia languesccns*, and substitute
bichromata, Gn. P.L.S.N.S.W. 1890, p. 839 (*languescens*).

BOARMIADÆ.

Idiodes prionosema, Turn. P.L.S.N.S.W. 1919, p. 291. Strahan.

NOCTUOIDEA.

ARCTIADÆ.

Amsacta.
**eurymochla*, Turn. P.R.S. Tas. 1926, p. 119. Beaconsfield.

NOCTUIDÆ.

Agrotinæ.

Androdes, Turn.

tibiata, Gn. Cat. Lep. Phal. IV., p. 379. Beaconsfield.

PSYCHOIDEA.

LIMACODIDÆ.

Doratifera oxlei, Newm. P.L.S.N.S.W. 1926, p. 419. Hobart.

ZYGÆNOIDEA.

ZYGÆNIDÆ.

Pollanisus lithopastus, Turn. P.L.S.N.S.W. 1926, p. 444. Hobart; Rosebery; Strahan.

[Erroneously identified in Part I. with *cyanotus*, Meyr., a species which has not been taken in Tasmania. I no longer refer the *Zygænidæ* to the *Psychoidea*, but consider them a distinct super family.]

PYRALOIDEA.

PHYCITIDÆ.

Ephestia, Gn.

cautella, Wlk. Brit. Lep., p. 373 (*ficulella*). Launceston. (*Introduced.*)

kuehniella, Zel. Brit. Lep., p. 374. Launceston. (*Introduced.*)

Plodia, Gn.

interpunctella, Hb. Brit. Lep., p. 372. Launceston. (*Introduced.*)

GALLERIADÆ.

Eucallionyma, Rag.

sarcodes, Meyr. P.L.S.N.S.W. 1882, p. 172. Hobart; Launceston.

CRAMBIDÆ.

Platytes, Gn. [This genus should replace *Thinasotia*, Hb., in Part I.]

**contempta*, Turn. P.R.S. Tas. 1926, p. 120. Moina, 2,000 ft.

PYRAUSTIDÆ.

Hellula, Gn.

undalis, Fab. Delt & Pyr, p. 416 (*hydralis*). Launceston.

Eclipsiodes drosera, Meyr. Tr. E.S. 1897 p. 245. Hobart; Strahan.

Scoparia chiasta, Meyr. Tr. N.Z. Inst. 1884, p. 74. Launceston.

PTEROPHORIDEA.

PTEROPHORIDÆ.

Omit *Platyptilia emissalis*, Wlk., and substitute *omissalis*, Fletcher. Tr. E.S. 1885, p. 448 (*emissalis*),

TINEOIDEA.

CARPOSINIDÆ.

Bondia, Newm.

nigella, Newm. P.L.S.N.S.W. 1882, p. 182. Hobart

Carposina, H-Sch.

mediella, Wlk. P.L.S.N.S.W. 1881, p. 669 (*pterocosmana*). Mt. Wellington, 2,500 ft.; Deloraine.

petræa, Meyr. P.L.S.N.S.W. 1910, p. 151. Strahan.

**latebrosa*, Meyr. P.L.S.N.S.W. 1910, p. 153. Deloraine; Rosebery; Strahan.

Paramorpha, Meyr.

semotheta, Meyr. P.L.S.N.S.W. 1910, p. 154. Hobart; Mt. Wellington, 3,000 ft.; National Park, 2,000 ft.

**eburneola*, Turn. P.R.S. Tas. 1926, p. 120. Rosebery.

Coscinoptycha, Meyr.

improbana, Meyr. P.L.S.N.S.W. 1881, p. 701. Launceston.

Sosineura, Meyr.

mimica, Low. Tr. R.S.S.A. 1893, p. 168. Hobart; Rosebery.

PHALONIADÆ.

Heliocosma, Meyr.

incongruana, Wlk. P.L.S.N.S.W. 1881, p. 695. Hobart; St. Helen's; Lake Fenton, 3,500 ft.; Deloraine; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.; Strahan.

rhodopnoana, Meyr. P.L.S.N.S.W. 1881, p. 694. St. Helen's.

TORTRICIDÆ.

Proselena, Meyr.

annosana, Meyr. P.L.S.N.S.W. 1881, p. 421. Launceston.

Isochorista, Meyr.

encotodes, Meyr. P.L.S.N.S.W. 1910, p. 166. Mt. Wellington, 1,200 ft.; Burnie; Rosebery.

helota, Meyr. P.L.S.N.S.W. 1910, p. 168. Deloraine.

panæolana, Meyr. P.L.S.N.S.W. 1881, p. 426. Hobart; Mt. Wellington, 2,500 ft.; Zeehan.

chaodes, Meyr. P.L.S.N.S.W. 1910, p. 168. Hobart; Mt. Wellington, 2,500 ft.; Eaglehawk Neck; Russell Falls; Lake Fenton, 3,500 ft.; Waratah.

Pyrgotis, Meyr.

insignana, Meyr. P.L.S.N.S.W. 1881, p. 440. Mt. Wellington, 2,500 ft.; Lake Fenton, 3,500 ft.; Beaconsfield; Deloraine; Cradle Mountain, 3,000 ft.

Acropolitis, Meyr.

dolosana, Wlk. P.L.S.N.S.W. 1881, p. 435. Deloraine.

impletana, Wlk. P.L.S.N.S.W. 1881, p. 431. Hobart; Lake Fenton, 3,500 ft.

**ergophora*, Meyr. P.L.S.N.S.W. 1910, p. 175. Hobart; Mt. Wellington, 2,500 ft.; Russell Falls; Bothwell; St. Helen's; Rosebery; Strahan.

**ptychosema*, Turn. P.R.S. Tas. 1926, p. 121. Cradle Mountain, 3,000 ft.

rudis, Wlk. P.L.S.N.S.W. 1910, p. 177. Hobart; Launceston; Burnie.

lignigerana, Wlk. P.L.S.N.S.W. 1881, p. 437. Launceston; Beaconsfield.

**Alytopistis*, Meyr.

**tortricitella*, Wlk. Cat. Brit. Mus. XXXV., p. 1812.

Batodes, Gn.

epiglypta, Meyr. P.L.S.N.S.W. 1881, p. 462 (*conjunctana)*. Launceston; Deloraine.

conjunctana, Wlk. P.L.S.N.S.W. 1881, p. 461 (*hemicryptana*). St. Helen's; Launceston; Deloraine.

Authomæma, Turn.

pentacosma, Low. P.L.S.N.S.W. 1900, p. 409. Bothwell.

**Paraphyas*, Turn.

**callixena*, Turn. P.R.S. Tas. 1926, p. 122. Rosebery.

Capua, Stph.

cosmopis, Low. Tr. R.S.S.A. 1894, p. 87. Bothwell; Ross; Launceston.

diemeniana, Zel. P.L.S.N.S.W. 1910, p. 185.

**pentazona*, Low. P.L.S.N.S.W. 1910, p. 185. Hobart; Lake Fenton, 3,500 ft.; Deloraine; Cradle Mountain, 3,000 ft.; Zeehan.

**parastactis*, Meyr. P.L.S.N.S.W. 1910, p. 186. Deloraine.

**poliobaphes*, Turn. P.R.S. Tas. 1926, p. 122. Hobart; Mt. Wellington, 2,500 ft.

**asemantica*, Turn. P.R.S. Tas. 1926, p. 123. Wilmot; Burnie.

euphona, Meyr. P.L.S.N.S.W. 1910, p. 189. Hobart; Bothwell; Launceston; Deloraine; Cradle Mountain, 3,000 ft.; Rosebery.

**nimbosa*, Turn. P.R.S. Tas. 1926, p. 123. Launceston; Rosebery.

dryina, Meyr. P.L.S.N.S.W. 1910, p. 192. Deloraine.

**eugrapta*, Turn. P.R.S. Tas. 1926, p. 124. Strahan.

**ephedra*, Meyr. P.L.S.N.S.W. 1910, p. 193. Mt. Wellington, 1,500 ft.

**thaleropis*, Turn. P.R.S. Tas. 1926, p. 124. Rosebery; Strahan.

vacuana, Wlk. P.L.S.N.S.W. 1881, p. 448. Launceston.

clarana, *Meyr*. P.L.S.N.S.W. 1881, p. 475. Hobart; Campbell Town; St. Helen's; Deloraine; Wilmot; Moina, 2,000 ft.

hyperetana, Meyr. P.L.S.N.S.W. 1881, p. 479. Hobart; Launceston; Deloraine.

montivagana, Meyr. P.L.S.N.S.W. 1881, p. 477. Hobart; Bothwell; Ross; St. Helen's; Deloraine; Wilmot; Cradle Mountain, 3,000 ft.

intractana, Wlk. P.L.S.N.S.W. 1881, p. 454 *(sordidatana)*. Hobart; Launceston; Deloraine.

mersana, Wlk. P.L.S.N.S.W. p. 452 *(chimerinana)*. Hobart; Mt. Wellington; Bothwell; Ross; St. Helen's; Launceston; Deloraine.

**eucycla*, Turn. Tr. R.S.S.A. 1916, p. 509. Huon River.

scotinopa, Low. Tr. R.S.S.A. 1902, p. 235. Launceston.

isoscelana, Meyr. P.L.S.N.S.W. 1881, p. 470. St. Helen's; Launceston; Zeehan.

placoxantha, Low. Tr. R.S.S.A. 1896, p. 160. Hobart; Mt. Wellington, 1,500-2,500 ft.; Russell Falls; Wilmot; Cradle Mountain, 3,000 ft.; Zeehan, Strahan.

oxygrammana, Meyr. P.L.S.N.S.W. 1881, p. 460. Hobart; Launceston.

**effulgens*, Meyr. P.L.S.N.S.W. 1910, p. 202. Zeehan.

**cirrhoptera*, Turn. P.R.S. Tas. 1926, p. 124. Cradle Mountain, 3,000 ft.

Atelodora, Meyr.

pelochytana, Meyr. P.L.S.N.S.W. 1881 p. 427. Deloraine.

Homona, Wlk.

mediana, Meyr. P.L.S.N.S.W. 1910, p. 210. Hobart; Deloraine.

Cacœcia, Hb.

polygraphana, Wlk. P.L.S.N.S.W. 1881, p. 495. Hobart; Mt. Wellington, 2,500 ft.; Russell Falls; Lake Fenton, 3,500 ft.; Campbell Town; St. Helen's; Launceston; Deloraine; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.; Burnie; Zeehan; Strahan.

australana, Lewin. P.L.S.N.S.W. 1881, p. 485. Launceston; Strahan.

**Epiphyas*, Turn.

**eucyrta*, Turn. P.R.S. Tas. 1926, p. 125. Beaconsfield; Rosebery; Strahan.

**chlidana* Turn. P.R.S. Tas. 1926, p. 126. Rosebery.

Tortrix, *Lin.*

**calculata*, Meyr. P.L.S.N.S.W. 1910, p. 223. Deloraine.

**incompta*, Turn. P.R.S. Tas. 1926, p. 126. Cradle Mountain, 3,000 ft.

xylodes, Meyr. P.L.S.N.S.W. 1910, p. 224. Hobart; Mt. Wellington, 2,500 ft.; Russell Falls; Lake Fenton, 3,500 ft.; Launceston; Cradle Mountain, 3,000 ft.; Burnie; Strahan.

ashworthana, Newm. P.L.S.N.S.W. 1881 p. 500 (*responsana*). Hobart; Bothwell; Launceston; Deloraine.

postvittana, Wlk. P.L.S.N.S.W. 1881, p. 502. Hobart; Mt. Wellington, 1,500-2,500 ft.; Russell Falls; Lake Fenton, 3,500 ft.; Bothwell; Launceston; Deloraine; Wilmot; Cradle Mountain, 3,000 ft.; Burnie; Rosebery; Zeehan; Strahan.

caryotis, Meyr. P.L.S.N.S.W. 1910, p. 227. Russell Falls; Burnie; Rosebery; Strahan.

**hemiphœna*, Turn. P.R.S. Tas. 1926, p. 126. Russell Falls; Zeehan.

erysibodes, Turn. Tr. R.S.S.A. 1916, p. 512. Bothwell.

**dotatana*, Wlk. P.L.S.N.S.W. 1910, p. 229.

**ophiodesma*, Low. P.L.S.N.S.W. 1910, p. 229. Russell Falls; Sheffield; Strahan.

**cetrata*, Meyr. P.L.S.N.S.W. 1910, p. 230. Hobart; Deloraine.

**arcaria*, Meyr. P.L.S.N.S.W. 1910, p. 231. Deloraine.

**lycodes*, Meyr. P.L.S.N.S.W. 1910, p. 232. Mt. Wellingon, 3,500 ft.

fabricata, Meyr. P.L.S.N.S.W. 1910, p. 233. Lake Fenton, 3,500 ft.; Wilmot; Burnie.

sobriana, Wlk. P.L.S.N.S.W. 1881, p. 504 (*mnemosynana*). Hobart; Mt. Wellington, 2,500 ft.; Russell Falls.

**acrothecta*, Turn. P.R.S.Q. 1926, p. 128. Mt. Wellington, 2,500 ft.

**psapharana*, Meyr. P.L.S.N.S.W. 1882, p. 174. Hobart; Launceston.

**euides*, Turn. P.R.S. Tas 1926, p. 127. Mt. Wellington, 2,500 ft.

**loxotoma*, Turn. P.R.S. Tas. 1926, p. 127. Mt. Wellington. 2,500 ft.

**plastica*, Meyr. P.L.S.N.S.W. 1910, p. 234. Hobart; Mt. Wellington, 2,500-3,000ft.; Russell Falls; Swansea; Cradle Mountain, 3,000 ft.; Burnie; Rosebery.

spodota, Meyr. P.L.S.N.S.W. 1910, p. 235. Mt. Wellington, 2,500-3,000 ft.

stigmatias, Meyr. P.L.S.N.S.W. 1910, p. 237. Deloraine.

psarodes, Meyr. P.L.S.N.S.W. 1910, p. 238. Hobart.

laganodes, Meyr. P.L.S.N.S.W. 1910 p. 238. Bothwell; Rosebery.

**astathmeta*, Turn. P.R.S. Tas. 1926, p. 128. Cradle Mountain, 3,000 ft.

lythrodana, Meyr. P.L.S.N.S.W. 1881, p. 497. Mt. Wellington; Lake Fenton, 3,500 ft.; Cradle Mountain, 3,000 ft.; Burnie; Strahan.

amœnana, Wlk. P.L.S.N.S.W. 1881, p. 510. Moina, 2.000 ft.; Cradle Mountain, 3,000 ft.

subfurcatana, Wlk. P.L.S.N.S.W. 1881, p. 511. Hobart; Parattah; St. Helen's; Launceston; Deloraine; Wilmot; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.; Guildford, 2,000 ft.

hydractis, Meyr. P.L.S.N.S.W. 1910, p. 244. Hobart; Cradle Mountain, 3,000 ft.

**polyphrica*, Turn. P.R.S. Tas. 1926, p. 129. Cradle Mountain, 3,000 ft.

lathræa, Meyr. P.L.S.N.S.W 1910, p. 248. Deloraine.

aulacana, Meyr. P.L.S.N.S.W. 1881, p. 513. Deloraine.

**alysidina*, Turn. P.R.S. Tas. 1926, p. 129. Mt. Wellington, 2,500 ft.

**eucela*, Meyr. P.L.S.N.S.W. 1910, p. 250. Mt. Wellington, 3,000 ft.

**telephanta*, Meyr. P.L.S.N.S.W. 1910, p. 250. Mt. Wellington, 4,000 ft.; Lake Fenton, 3,500 ft.; Wilmot.

tasmaniana, Wlk. P.L.S.N.S.W. 1881, p. 524. Hobart; St. Helen's.

**schematica*, Turn. P.R.S. Tas. 1926, p. 130. Launceston; Wilmot.

nephaula, Meyr. P.L.S.N.S.W. 1910, p. 251. Mt. Wellington, 3,000-3,500 ft.; Lake Fenton, 3,500 ft.

**concinnula*, Turn. P.R.S. Tas. 1926, p. 130. Mt. Wellington, 2,500 ft.

**polymicta*, Turn. P.R.S. Tas. 1926, p. 131. Mt. Wellington, 2,500 ft.

liquidana, Meyr. P.L.S.N.S.W. 1881, p. 505. Hobart; Mt. Wellington; Lake Fenton, 3,500 ft.; St. Helen's; Launceston; Cradle Mountain 3,000 ft.; Rosebery; Strahan.

indigestana, Meyr. P.L.S.N.S.W. 1881, p. 520. Hobart; St. Helen's; Zeehan; Strahan.

concordana, Meyr. P.L.S.N.S.W. 1881, p. 519. Hobart; Moina, 2,000 ft.

concolorana, Meyr. P.L.S.N.S.W. 1881, p. 522. Hobart; St. Helen's; Rosebery.

**dyschroa*, Turn. P.R.S. Tas. 1926, p. 131. Cradle Mountain, 3,000 ft.

divulsana, Wlk. P.L.S.N.S.W. 1881, p. 516 *(glaphyrana)*. Hobart; Mt. Wellington, 2,500 ft.; Lake Fenton, 3,500 ft.; Bothwell; Ross; Launceston; Beaconsfield; Deloraine; Wilmot, Moina, 2,000 ft.; Zeehan.

**tenuifascia*, Turn. P.R.S. Tas. 1926, p. 131. Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.

Epichorista, Meyr.

**serena*, Meyr. P.L.S.N.S.W. 1910, p. 256. Mt. Wellington, 2,000-2,500 ft.; Russell Falls; National Park, 2,000 ft.; Lake Fenton, 3,500 ft.; Cradle Mountain, 3,000 ft.

**smenodes*, Meyr. P.L.S.N.S.W. 1910, p. 256. Hobart.

**camacinana*, Meyr. P.L.S.N.S.W. 1881, p. 172. Hobart; Mt. Wellington, 2,000-2,500 ft.; Deloraine; Wilmot.

**therina*, Meyr. P.L.S.N.S.W. 1910, p. 259. Deloraine.

Arotrophora, Meyr.

arctuatalis, Wlk. P.L.S.N.S.W. 1881, p. 530. Launceston.

**pirastis*, Meyr. P.L.S.N.S.W. 1910, p. 263. Deloraine.

anemarcha, Low. P.L.S.N.S.W. 1910, p. 264. Launceston.

castanea, Meyr. P.R.S. Tas. 1926, p. 132. Lake Fenton, 3,500 ft.

hemerana, Meyr. P.L.S.N.S.W. 1882, p. 176. Mt. Wellington, 3,000 ft.

lividana, Meyr. P.L.S.N.S.W. 1881, p. 531. Hobart; St. Helen's; Launceston.

anaptis, Meyr. P.L.S.N.S.W. 1910, p. 269. St. Helen's.

Cnephasia, Curtis.

**phosphora*, Meyr. P.L.S.N.S.W. 1910, p. 274. Mt. Wellington, 2,500-3,000 ft.

**crotala*, Meyr. P.L.S.N.S.W. 1910, p. 276. Deloraine.

stereodes, Meyr. P.L.S.N.S.W. 1910, p. 277. Mt. Wellington; Launceston; Deloraine.

**fractifascia*, Turn. P.R.S. Tas. 1926, p. 134. Russell Falls, Lake Fenton, 3,500 ft.; Cradle Mountain, 3,000 ft.

**contortula* Turn. P.R.S. Tas. 1926, p. 134. Wilmot.

**gnophodryas*, Low. P.R.S. Tas. 1926, p. 133. Hobart; Mt. Wellington, 2,500 ft.; Russell Falls; National Park, 2,000 ft.; Lake Fenton, 3,500 ft.; Wilmot; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.

Scolioplecta, Meyr.

comptana, Wlk. P.L.S.N.S.W. 1881, p. 646. Hobart; Campbell Town; St. Helen's; Launceston; Strahan.

EUCOSMIDÆ.

Hermenias, Meyr.

epidola, Meyr. P.L.S.N.S.W. 1911, p. 225. Hobart; Swansea; Deloraine.

imbrifera, Meyr. P.L.S.N.S.W. 1911, p. 226. Launceston.

Bathrotoma, Meyr.

constrictana, Meyr. P.L.S.N.S.W. 1881, p. 675. Rosebery; Zeehan; Strahan.

Spilonota, Stph.

hypomolybda, Turn. P.R.S. Tas. 1926, p. 135. Launceston.

macropetana, Meyr. P.L.S.N.S.W. 1881, p. 683. Hobart; Launceston; Strahan.

ejectana, Wlk. P.L.S.N.S.W. 1881, p. 681. Hobart; Russell Falls; St. Helen's; Beaconsfield; Strahan.

chalcitis, Meyr. P.L.S.N.S.W. 1911, p. 231. Launceston.

tarachodes, Meyr. P.L.S.N.S.W. 1911, p. 231. Mt. Wellington, 3,500 ft.

argyrotypa, Turn. P.R.S. Tas. 1926, p. 135. Cradle Mountain, 3,000 ft.

morosa, Meyr. P.L.S.N.S.W. 1911, p. 232. Deloraine.

tranquilla, Meyr. P.L.S.N.S.W. 1911, p. 233. Deloraine; Rosebery.

honesta, Meyr. P.L.S.N.S.W. 1911, p. 233. Hobart; Deloraine; Cradle Mountain 3,000 ft.; Rosebery.

Acroclita, Led.

longestriata, Drnt. P.L.S.N.S.W. 1911, p. 235. Deloraine; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.

stilpna, Turn. Tr. R.S.S.A. 1925, p. 55. Lake Fenton, 3,500 ft.; Cradle Mountain, 3,000 ft.; Rosebery; Strahan.

fidana, Meyr. P.L.S.N.S.W. 1881, p. 667. St. Helen's; Rosebery.

biscissana, Meyr. P.L.S.N.S.W. 1881, p. 674. St. Helen's.

perspectana, Wlk. P.L.S.N.S.W. 1881, p. 671. Hobart; Zeehan.

thalassinana, Meyr. P.L.S.N.S.W. 1881, p. 672. Strahan.

Eucosma, Hb.

triangulana, Meyr. P.L.S.N.S.W. 1881, p. 670. Hobart; Bothwell; St. Helen's; Launceston.

plebeiana, Zel. P.L.S.N.S.W. 1881, p. 659. Launceston. (*Introduced.*)

Laspeyresia, Hb.

pomonella, Lin. P.L.S.N.S.W. 1881, p. 657. Hobart; Launceston. (*Introduced.*)

ÆGERIADÆ.

Trochilium, Scop.

tipuliforme, Clerck. Brit. Ent., p. 565. Launceston. (*Introduced.*)

ELACHISTIDÆ.

Batrachedra, Sttn.

arenosella, Wlk. P.L.S.N.S.W. 1897, p. 302. Mt. Wellington; Deloraine.

**metaxias*, Meyr. P.L.S.N.S.W. 1897, p. 303. Mt. Wellington, 2,500 ft.

sterilis, Meyr. P.L.S.N.S.W. 1897, p. 304. Hobart; Launceston.

helarcha, Meyr. P.L.S.N.S.W. 1897, p. 305. St. Helen's; Deloraine.

**ditrota*, Meyr. P.L.S.N.S.W. 1897, p. 305. Launceston; Deloraine.

liopis, Meyr. P.L.S.N.S.W. 1897, p. 308. Campbell Town.

plagiocentra, Meyr. P.L.S.N.S.W. 1897, p. 309.

Labdia, Wlk.

arimaspia, Meyr. P.L.S.N.S.W. 1897, p. 347. Launceston.

autotoma, Meyr. Exot. Micro. II., p. 284. Deloraine.

oxysema, Meyr. P.L.S.N.S.W. 1897, p. 351. Swansea.

anarithma, Meyr. P.L.S.N.S.W. 1897, p. 355. St. Helen's; Deloraine.

semnostola, Meyr. P.L.S.N.S.W. 1897, p. 356. Hobart; Campbell Town.

Limnœcia, Sttn.

**trisema*, Meyr. P.L.S.N.S.W. 1897, p. 361. Hobart; Mt. Wellington, 2,500 ft.

leptomeris, Meyr. P.L.S.N.S.W. 1897, p. 362. Campbell Town.

scoliosema, Meyr. P.L.S.N.S.W. 1897, p. 366. Launceston; Wilmot.

camptosema, Meyr. P.L.S.N.S.W. 1897, p. 366. Mt. Wellington.

Zapyrastra, Meyr.

calliphana. Meyr. P.L.S.N.S.W. 1897, p. 368. Hobart; Deloraine.

Microcolona, Meyr.

crypsicasis, Meyr. P.L.S.N.S.W. 1897, p. 373. Deloraine.

nodata, Meyr. P.L.S.N.S.W. 1897, p. 373. Deloraine.

epixutha, Meyr. P.L.S.N.S.W. 1897, p. 376. Hobart.

arizela, Meyr. P.L.S.N.S.W. 1897, p. 378. Hobart.

Syntomactis, Meyr.

ochlopa, Meyr. P.L.S.N.S.W. 1897, p. 381. St. Helen's.

Heliozela, H-Sch.

prodela, Meyr. P.L.S.N.S.W. 1897, p. 404. Deloraine.

**anantia*, Meyr. P.L.S.N.S.W. 1897, p. 405. Deloraine.

**Pseliastis*, Meyr.

**spectropa*, Meyr. P.L.S.N.S.W. 1897, p. 407.

**trizona*, Meyr. P.L.S.N.S.W. 1897, p. 407. Hobart.

**xanthodisca*, Meyr. P.L.S.N.S.W. 1897, p. 407. Hobart.

Hoplophanes, Meyr.

phæochalcha, Meyr. P.L.S.N.S.W. 1897, p. 414. Cradle Mountain, 3,000 ft.

**Dicasteris*, Meyr.

**leucastra*, Meyr. Tr. R.S.S.A. 1906, p. 55.

Notodryas, Meyr.

aëria, Meyr. P.L.S.N.S.W 1897, p. 427. Deloraine.

Epermenia, Hb.

eurybias, Meyr. P.L.S.N.S.W. 1897, p. 429. Hobart; Strahan.

opsias, Meyr. P.L.S.N.S.W. 1897, p. 430. Deloraine.

**aphronesa*, Meyr. P.L.S.N.S.W. 1897, p. 431.

Elachista, Treits.

synethes, Meyr. P.L.S.N.S.W. 1897, p. 333. Hobart; St. Helen's; Deloraine.

gerasmia, Meyr. P.L.S.N.S.W. 1897, p. 334. Hobart.

cycotis, Meyr. P.L.S.N.S.W. 1897, p. 335. Mt. Wellington, 4,000 ft.; Deloraine; Moina, 2,000 ft.

**catarata*, Meyr. P.L.S.N.S.W. 1897, p. 338. Deloraine.

**diatoma*, Turn. P.R.S. Tas. 1926, p. 136. Cradle Mountain, 3,000 ft.

Rhadinastis, Meyr.

sideropa, Meyr. P.L.S.N.S.W. 1897, p. 312. Deloraine.

Coleophora, Hb.

deauratella, Zel. P.R.S. Tas. 1926, p. 136. Hobart; Wilmot; Burnie; Rosebery; Strahan *(Introduced.)*

Gelechiadæ.

Apatetris, Stgr.

**acrocola*, Turn. P.R.S. Tas. 1926, p. 136. Wilmot.

**niphaula*, Meyr. P.L.S.N.S.W. 1904, p. 263. Launceston.

**miarodes*, Meyr. P.L.S.N.S.W. 1904, p. 263. St. Helen's.

leucomichla, Meyr. P.L.S.N.S.W. 1904, p. 265. Deloraine.

spectrella, Meyr. P.L.S.N.S.W. 1904, p. 266. Deloraine.

**hyperænicta*, Turn. P.R.S. Tas. 1926, p. 137. Strahan.

Pycnostola, Meyr.

stalactis, Meyr. P.L.S.N.S.W. 1904, p. 271. St. Helen's.

actias, Meyr. P.L.S.N.S.W. 1904, p. 272. Hobart.

Megacraspedus, Zel.

platyleuca, Meyr. P.L.S.N.S.W. 1904, p. 274. Deloraine.

inficeta, Meyr. P.L.S.N.S.W. 1904, p. 277. St. Helen's.

niphodes, Low. P.L.S.N.S.W. 1904, p. 278. Deloraine.

pityritis, Meyr. P.L.S.N.S.W. 1904, p. 278. Campbell Town; Launceston.

popularis, Meyr. P.L.S.N.S.W. 1904, p. 282. Hobart; Deloraine.

Iulota, Meyr.

**triglossa*, Meyr. P.L.S.N.S.W. 1904, p. 284. Deloraine.

epispila, Low. P.L.S.N.S.W. 1904, p. 284. Hobart; St. Helen's.

Aristotelia, Hb.

furtiva, Meyr. P.L.S.N.S.W. 1904, p. 288. St. Helen's.

thetica, Meyr. P.L.S.N.S.W. 1904, p. 289. Hobart; St. Helen's.

centrosema, Low. P.L.S.N.S.W. 1904, p. 291. Hobart; Swansea; Launceston; Deloraine.

**bacillum*, Turn. P.R.S. Tas. 1926, p. 137. Strahan.

Thiotricha, Meyr.

parthenica, Meyr. P.L.S.N.S.W. 1904, p. 297. St. Helen's; Launceston; Rosebery; Strahan.

Stomopteryx, Hein.

simplicella, Wlk. P.L.S.N.S.W. 1904, p. 305. Launceston; Deloraine.

Macrenches, Meyr.

clerica, Rosen. P.L.S.N.S.W. 1904, p. 307. Hobart; Bothwell; Launceston; Beaconsfield; Rosebery.

Phthorimæa, Meyr.

operculella, Zel. P.L.S.N.S.W. 1904, p. 316. Hobart. *(Introduced.)*

Epibrontis, Meyr.

hemichlæna, Low. P.L.S.N.S.W. 1904, p. 324. Hobart.

Epimimastis, Meyr.

porphyroloma, Low. P.L.S.N.S.W. 1904, p. 325. Campbell Town; Launceston; Rosebery.

Sphaleractis, Meyr.

platyleuca, Low. P.L.S.N.S.W. 1904, p. 329. St. Helen's.

epiclysta, Meyr. Exot. Micro. II., p. 299 (1920). St. Helen's; Launceston.

Hemiarcha, Meyr.

thermochroa, Low. P.L.S.N.S.W. 1904, p. 332. Hobart; Wilmot.

Protolechia, Meyr.

crypsibatis, Meyr. P.L.S.N.S.W. 1904, p. 344. Deloraine.

**cladara*, Meyr. P.L.S.N.S.W. 1904, p. 346. Hobart.

**chionoprora*, Turn. P.R.S. Tas. 1926, p. 138. Rosebery.

**mechanistis*, Meyr. P.L.S.N.S.W. 1904, p. 360. Hobart; Evandale.

mesochra, Low. P.L.S.N.S.W. 1904, p. 365. Launceston.

**crypsicneca*, Turn. P.R.S. Tas. 1926, p. 138. Cradle Mountain, 3,000 ft.

phasianis, Meyr. P.L.S.N.S.W. 1904, p. 382. Launceston.

eumela, Low. P.L.S.N.S.W. 1904, p. 382. Launceston.

Orthoptila, Meyr.

abruptella, Wlk. P.L.S.N.S.W. 1904, p. 392. Launceston.

Crocanthes, Meyr.

prasinopis, Meyr. P.L.S.N.S.W. 1904, p. 399. Hobart; Launceston.

glycina, Meyr. P.L.S.N.S.W. 1904, p. 400. Hobart; Launceston; Beaconsfield.

Lecithocera, H-Sch.

terrigena, Meyr. P.L.S.N.S.W. 1904, p. 406. Launceston.

Hyodectis, Meyr.

crenoides, Meyr. P.L.S.N.S.W. 1904, p. 411. Strahan.

Anarsia, Zel.

dryinopa, Low. P.L.S.N.S.W. 1904, p. 416. Hobart; Bothwell; Launceston.

XYLORYCTIDÆ.

Cryptophasa, Lewin.

albicosta, Lewin. Tr. R.S.S.A. 1890, p. 33. Hobart; St. Helen's; Launceston.

Tymbophora, Meyr.

peltastis, Meyr. Tr. R.S.S.A. 1890, p. 56. Launceston.

Xylorycta, Meyr.

parabolella, Meyr. Tr. R.S.S.A. 1890, p. 63. Hobart.

**bipunctella*, Wlk. Tr. R.S.S.A. 1890, p. 63. Launceston.

argentella, Wlk. Tr. R.S.S.A. 1890, p. 60. Hobart; Launceston; Deloraine.

micracma, Meyr. Tr. R.S.S.A. 1890, p. 64. Beaconsfield; Deloraine.

Lichenaula, Meyr.

calligrapha, Meyr. Tr. R.S.S.A. 1890, p. 48. Launceston.

arisema, Meyr. Tr. R.S.S.A. 1890, p. 48. St. Helen's.

Maroga, Wlk.

unipunctana, Don. Tr. R.S.S.A. 1890, p. 40. Hobart; Launceston.

Chalarotona, Meyr.

**insincera*, Meyr. Tr. R.S.S.A. 1890 p. 66. Hobart; Deloraine.

Scieropepla, Meyr.

polyxesta, Meyr. Tr. R.S.S.A. 1890, p. 67. Hobart; Lake Fenton, 3,500 ft.; Launceston; Deloraine.

rimata, Meyr. Tr. R.S.S.A. 1890, p. 69. Campbell Town; St. Helen's.

serina, Meyr. Tr. R.S.S.A. 1890, p. 70. Hobart; Launceston.

Agriophara, Rosen.

gravis, Meyr. Tr. R.S.S.A. 1890, p. 77. Deloraine.

discobola, Turn. Ann. Queens. Mus. IV., p. 32 (1897). St. Helen's; Launceston.

**diminuta*, Rosen, Tr. R.S.S.A. 1890, p. 79. Launceston.

cinerosa, Rosen. Tr. R.S.S.A. 1890, p. 78. Hobart; Russell Falls; Bothwell; Ross.

ŒCOPHORIDÆ.

Macrobathra, Meyr.

nephelomorpha, Meyr. P.L.S.N.S.W. 1885, p. 820. Hobart; Launceston; Beaconsfield.

ceraunobola, Meyr. P.L.S.N.S.W. 1885, p. 818. Hobart; Bothwell; Ross.

synastra, Meyr. P.L.S.N.S.W. 1885, p. 815. St. Helen's.

alternatella, Wlk. P.L.S.N.S.W. 1885, p. 812. Hobart; Rosebery.

**heminephela*, Meyr. P.L.S.N.S.W. 1885, p. 806. Hobart; Launceston.

**dasyplaca*, Low. Tr. R.S.S.A. 1894, p. 103. Windermere.

**anemarcha*, Meyr. P.L.S.N.S.W. 1885, p. 805, Launceston.

**asemanta*, Low. Tr. R.S.S.A. 1894, p. 103. Windermere.

chrysotoxa, Meyr. P.L.S.N.S.W. 1885, p. 804. Hobart; Bothwell; Launceston; Beaconsfield.

Ochlogenes, Meyr.
adrectella, Wlk. P.L.S.N.S.W. 1885, p. 797. Launceston.

Paratheta, Meyr.
syrtica, Meyr. Tr. R.S.S.A. 1902, p. 174. Hobart; Campbell Town; Launceston.

Dissella, Meyr.
aleurota, Meyr. P.L.S.N.S.W. 1885, p. 799. Campbell Town; St. Helen's; Launceston; Deloraine.

Endrosis, Hb.
lactella, Schiff. P.L.S.N.S.W. 1897, p. 426. Hobart; Campbell Town; Swansea; Launceston; Deloraine; Strahan. *(Introduced.)*

Borkhausenia, Hb.
anthemodes, Meyr. P.L.S.N.S.W. 1885, p. 780. Mt. Wellington; Russell Falls; Zeehan.

lychnosema, Meyr. P.L.S.N.S.W. 1885, p. 787. St. Helen's.

eremæa, Meyr. P.L.S.N.S.W. 1885, p. 783. Mt. Wellington, 2,500 ft.

lymphatica, Meyr. P.L.S.N.S.W. 1885, p. 785. Hobart; Deloraine.

crymorrhoa, Meyr. P.L.S.N.S.W. 1883, p. 1663. Mt. Wellington, 2,500-3,000 ft.; Lake Fenton, 3,500 ft.; Cradle Mountain, 3,000 ft.

canephora, Meyr. P.L.S.N.S.W. 1883, p. 339. Hobart; Mt. Wellington, 2,500 ft.; Lake Fenton 3,500 ft.; Bothwell; Launceston; Beaconsfield; Cradle Mountain 3,000 ft.

eurrhoa, Meyr. P.L.S.N.S.W. 1885, p. 789. Launceston; Rosebery.

trivialis, Meyr. Exot. Micro. I., p. 172. Deloraine.

acalles, Turn. P.R.S. Tas. 1926, p. 139. Mt. Wellington, 2,500 ft.

pseudospretella, Sttn. P.L.S.N.S.W. 1885, p. 782 In all houses. *(Introduced.)*

Leptocroca, Meyr.
epimicta, Meyr. P.L.S.N.S.W. 1885, p. 786. Russell Falls; Deloraine.

amydrosema, Low. Tr. R.S.S.A. 1903, p. 227. Mt. Wellington, 2,500 ft.; Russell Falls; Wilmot.

oicæa, Meyr. Tr. R.S.S.A. 1902, p. 147.

eucentra, Turn. P.R.S. Tas. 1926, p. 139. Mt. Wellington, 2,500 ft.; Russell Falls; Lake Fenton, 3,500 ft.; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.

silicolor, Turn. P.R.S. Tas. 1926, p. 140. Mt. Wellington, 2,500 ft.

Ioptera, Meyr.

aristogona, Meyr. P.L.S.N.S.W. 1883, p. 345. Launceston.

demica, Meyr. P.L.S.N.S.W. 1888, p. 1589. Hobart; Launceston.

Locheutis, Meyr.

philochlora, Meyr. P.L.S.N.S.W. 1883, p. 342. Deloraine.

desmophora, Meyr. P.L.S.N.S.W. 1883, p. 343. Mt. Wellington, 1,000-4,000 ft.

periscia, Meyr. P.L.S.N.S.W. 1888, p. 1589. Campbell Town; Launceston.

dolichotricha, Turn. P.R.S. Tas. 1926, p. 140. Mt. Wellington, 2,500 ft.

inconcinna, Turn. P.R.S. Tas. 1926, p. 141. Mt. Wellington, 2,500 ft.

Œnochroa, Meyr.

thermistis, Low. Tr. R.S.S.A. 1896, p. 166. St. Helen's.

homora, Meyr. Tr. R.S.S.A. 1902, p. 152. Hobart.

iobaphes, Meyr. P.L.S.N.S.W. 1883, p. 330. St. Helen's.

phœnochyta, Turn. P.R.S. Tas. 1926, p. 141. Russell Falls; Moina, 2,000 ft.

Trachypepla, Meyr.

charierga, Meyr. P.L.S.N.S.W. 1888, p. 1566. Deloraine.

hemicarpa, Meyr. P.L.S.N.S.W. 1887 p. 954. Launceston; Deloraine.

capsellata, Meyr. Exot. Micro. I., p. 157. Bothwell; Ross; Launceston; Beaconsfield; Moina, 2,000 ft.; Burnie.

glebifera, Turn. P.R.S. Tas. 1926, p. 142. Bothwell.

Barea, Wlk.

heterophanes, Turn. P.R.S. Tas. 1926, p. 143. Mt. Wellington; Russell Falls; Rosebery; Zeehan; Strahan.

atmophora, Turn. P.L.S.N.S.W. 1916, p. 345. Hobart; Launceston; Burnie.

melanodelta, Meyr. P.L.S.N.S.W. 1883, p. 359. Launceston.

**epethistis*, Meyr. Tr. R.S.S.A. 1902, p. 154. Russell Falls; Launceston; Beaconsfield; Deloraine; Burnie; Strahan.

micropis, Meyr. P.L.S.N.S.W. 1888, p. 1593. Zeehan.

banausa, Meyr. P.L.S.N.S.W. 1883, p. 356. Deloraine;

arbitra, Meyr. Exot. Micro. I., p. 167. Rosebery; Strahan.

psephophora, Meyr. P.L.S.N.S.W. 1883, p. 352. Hobart; Mt. Wellington, 3,500 ft.; Russell Falls; Lake Fenton, 3,500 ft.; St. Helen's; Launceston; Deloraine.

**hypselotropha*, Turn. P.R.S. Tas. 1926, p. 143. Cradle Mountain, 3,000 ft.

**semocausta*, Meyr. P.L.S.N.S.W. 1883, p. 350. Hobart; Russell Falls; Deloraine; Zeehan.

**helica*, Meyr. P.L.S.N.S.W. 1883, p. 351. Deloraine.

hyperarcha, Meyr. P.L.S.N.S.W. 1888, p. 1591. Russell Falls; Bothwell.

asbolæa, Meyr. P.L.S.N.S.W. 1883, p. 349. Deloraine; Strahan.

**psologramma*, Turn. P.L.S.N.S.W. 1916, p. 345. Hobart; Russell Falls; Launceston.

**Memeristis*, Meyr.

**spodiæa*, Meyr. Exot. Micro. I., p. 298. St. Helen's;

**Orescoa*, Turn.

**homoconia*, Turn. P.R.S. Tas. 1926, p. 142. Mt. Wellington, 2,500 ft.; Lake Fenton, 3,500 ft.

Eulechria, Meyr.

suppletella, Wlk. P.L.S.N.S.W. 1888, p. 1585. Deloraine.

**anomophanes*, Turn. P.R.S. Tas. 1926, p. 144. Mt. Wellington, 2,500 ft.

aërodes, Meyr. P.L.S.N.S.W. 1883, p. 321. Deloraine; Evandale.

xylopterella, Meyr. P.L.S.N.S.W. 1882, p. 543. Launceston.

textilis, Meyr. Tr. R.S.S.A. 1906, p. 36. Campbell Town.

elaphia, Meyr. P.L.S.N.S.W. 1883, p. 346. Hobart; Deloraine.

adoxella, Meyr. P.L.S.N.S.W. 1882, p. 540. Hobart; St. Helen's.

**ductaria*, Meyr. Exot. Micro. I., p. 159. Mt. Wellington; Lake Fenton, 3,500 ft.; Cradle Mountain, 3,000 ft.

**sciaphila*, Turn. P.R.S. Tas. 1926, p. 144. Lake Fenton, 3,500 ft.

**styracista*, Meyr. Exot. Micro. II., p. 370. Hobart.

**oxypeuces*, Turn. P.R.S. Tas. 1926, p. 144. Bothwell.

**paurogramma*, Meyr. P.L.S.N.S.W. 1882, p. 542. Mt. Wellington; Deloraine.

**sthenopis*, Turn. P.R.S. Tas. 1926, p. 145. Cradle Mountain, 3,000 ft.

habrophanes, Meyr. P.L.S.N.S.W. 1882, p. 532. Bothwell.

pœcilella, Meyr. P.L.S.N.S.W. 1882, p. 531. Hobart; Bothwell; Launceston; Beaconsfield.

hemiphanes, Meyr. P.L.S.N.S.W. 1882, p. 529. Launceston.

cirrhopis, Turn. P.R.S. Tas. 1926, p. 145. Russell Falls.

achalinella, Meyr. P.L.S.N.S.W. 1882, p. 523. St. Helen's.

scythropa, Meyr. P.L.S.N.S.W. 1883, p. 339. St. Helen's.

melesella, Newm. P.L.S.N.S.W. 1882, p. 516. Hobart.

**tacita*, Turn. P.R.S. Tas. 1926, p. 146. Zeehan; Strahan.

**umbrosa*, Meyr. Exot. Micro. I., p. 167. Zeehan.

mesophragma, Meyr. P.L.S.N.S.W. 1887, p. 950. Hobart; Zeehan; Strahan.

eriphila, Meyr. P.L.S.N.S.W. 1887 p. 946. Hobart.

**psathyropa*, Turn. P.R.S. Tas. 1926, p. 146. Cradle Mountain, 3,000 ft.

Tisobarica, Wlk.

**phæopyra*, Turn. P.R.S. Tas. 1926, p. 146. Mt. Wellington, 2,500 ft.

**ancyrota*, Meyr. P.L.S.N.S.W. 1883, p. 343. Deloraine.

Machimia, Clemens.

leucerythra, Meyr. P.L.S.N.S.W. 1882, p. 501. Launceston; Rosebery; Strahan.

moderatella, Wlk. P.L.S.N.S.W. 1887, p. 941. *(liosarca)*.

repandula, Zel. P.L.S.N.S.W. 1882, p. 499. Hobart; Russell Falls; St. Helen's; Launceston; Wilmot; Zeehan.

miltopsara, Turn. P.L.S.N.S.W. 1914, p. 560. Cradle Mountain, 3,000 ft.

**pastea*, Turn. P.R.S. Tas. 1926, p. 147. Russell Falls.

**brachytricha*, Turn. P.R.S. Tas. 1926, p. 147. Lake Fenton, 3,500 ft.; Cradle Mountain, 3,000 ft.

sobriella, Meyr. P.L.S.N.S.W. 1882, p. 495. Hobart.

ocellifera, Meyr. P.L.S.N.S.W. 1882, p. 488. Hobart.

demotica, Meyr. P.L.S.N.S.W. 1882, p. 489. Deloraine; Cradle Mountain, 3,000 ft.

Auchæreta, Meyr.

dorsivittella, Wlk. Tr. R.S.S.A. 1902, p. 146. Hobart; Launceston.

Euprionocera, Turn.

**hypertricha*, Turn. P.R.S. Tas. 1926, p. 147. Mt. Wellington, 3,500 ft.

Machaeretis, Meyr.

**agelæa*, Meyr. P.L.S.N.S.W. 1884, p. 1070. Deloraine.

**pelinopa*, Meyr. Tr. R.S.S.A. 1902, p. 133. Hobart; Launceston; Deloraine.

ægrella, Meyr. P.L.S.N.S.W. 1885, p. 772. Hobart; Lake Fenton, 3,500 ft.; Campbell Town; St. Helen's; Deloraine; Moina, 2,000 ft.

**coniata*, Meyr. P.L.S.N.S.W. 1884, p. 1069. Mt. Wellington; Deloraine.

psathyra, Meyr. P.L.S.N.S.W. 1885, p. 771. Hobart; Russell Falls; Lake Fenton, 3,500 ft.; Cradle Mountain, 3,000 ft.

samphoras, Meyr. P.L.S.N.S.W. 1885, p. 770. Campbell Town.

calligenes, Meyr. P.L.S.N.S.W. 1885, p. 768. Launceston.

Haplodyta, Meyr.

iochalcha, Meyr. P.L.S.N.S.W. 1885, p. 766. Deloraine.

thoracta, Meyr. P.L.S.N.S.W. 1885, p. 765. Deloraine; Cradle Mountain, 3,000 ft.

Tachystola, Meyr.

hemisema, Meyr. P.L.S.N.S.W. 1884, p. 1061. Launceston.

Ocystola, Meyr.

crystallina, Meyr. P.L.S.N.S.W. 1884, p. 1077. Hobart; St. Helen's; Wilmot; Cradle Mountain, 3,000 ft.

**lithophanes*, Meyr. P.L.S.N.S.W. 1884, p. 1075. Beaconsfield; Deloraine.

Hippomacha, Meyr.

**heliotricha*, Low. Tr. R.S.S.A. 1904, p. 168. Hobart.

Oxythecta, Meyr.

**nephelonata*, Meyr. P.L.S.N.S.W. 1884, p. 1051. Hobart; Russell Falls; Launceston; Deloraine; Cradle Mountain, 3,000 ft.

alternella, Wlk. P.L.S.N.S.W. 1884, p. 1050. Hobart; St. Helen's; Launceston.

Aristeis, Meyr.

chrysoteuches, Meyr. P.L.S.N.S.W. 1884, p. 762. Beaconsfield.

Deuterogonia, Rebel.

acroxantha, Meyr. P.L.S.N.S.W. 1884, p. 1066. Hobart; Russell Falls; Lake Fenton, 3,500 ft.; Deloraine; Cradle Mountain, 3,000 ft.; Strahan.

Cæsyra, Meyr.

**plectanora*, Turn. P.R.S. Tas. 1926, p. 148. Mt. Wellington, 2,500 ft.

**ochrocirrha*, Turn. P.R.S. Tas. 1926, p. 148. Cradle Mountain, 3,000 ft.

**isarithma*, Meyr. P.L.S.N.S.W. 1884, p. 1064. Mt. Wellington, 2,500 ft.

malacella, Meyr. P.L.S.N.S.W. 1884, p. 1062. Hobart; St. Helen's; Launceston.

**aclea*, Meyr. P.L.S.N.S.W. 1882, p. 456. Hobart; Mt. Wellington, 2,500 ft.; Lake Fenton, 3,500 ft.; Launceston; Deloraine; Cradle Mountain, 3,000 ft.

stenoptera, Meyr. P.L.S.N.S.W. 1884, p. 780. Hobart; St. Helen's; Launceston.

parvula, Meyr. P.L.S.N.S.W. 1884, p. 783. Hobart; Russell Falls; St. Helen's; Deloraine; Strahan.

ophthalmica, Meyr. P.L.S.N.S.W. 1884, p. 148. Hobart; Launceston.

**polyphila*, Turn. P.R.S. Tas. 1926, p. 148. Cradle Mountain, 3,000 ft.

dichroëlla, Zel. P.L.S.N.S.W. 1884, p. 767. Launceston.

kershawi, Low. Tr. R.S.S.A. 1902, p. 138. Bothwell.

translatella, Wlk. P.L.S.N.S.W. 1884, p. 769 (*iozona*). Hobart.

basilica, Meyr. P.L.S.N.S.W. 1884, p. 770. Hobart.

anthodora, Meyr. P.L.S.N.S.W. 1884, p 769. Hobart.

Euthictis, Meyr.

xanthodelta, Meyr. P.L.S.N.S.W. 1888, p. 1637. Hobart; Launceston; Deloraine.

marmaraspis, Meyr. P.L.S.N.S.W. 1880, p. 225.

Pleurota, Hb.

**themeropis*, Meyr. P.L.S.N.S.W. 1884, p. 749. Hobart; Lake Fenton, 3,500 ft.; Launceston.

**zalocoma*, Meyr. P.L.S.N.S.W. 1884, p. 749. Mt. Wellington, 2,500 ft.

tephrina, Meyr. P.L.S.N.S.W. 1884, p. 750. Deloraine.

**tritosticta*, Turn. P.R.S. Tas. 1926, p. 149. Lake Fenton, 3,500 ft.

**psephena*, Meyr. P.L.S.N.S.W. 1884, p. 751. Hobart; Mt. Wellington, 2,500 ft.; Russell Falls; National Park, 2,000 ft.

endesma, Meyr. P.L.S.N.S.W. 1884, p. 755. Mt. Wellington, 2,500 ft.; Russell Falls.

chlorochyta, Meyr. P.L.S.N.S.W. 1884, p. 757. Hobart; Launceston; Beaconsfield; Wilmot; Burnie; Rosebery.

**titanitis*, Turn. P.R.S. Tas. 1926, p. 149. Cradle Mountain, 3,000 ft.

Atheropla, Meyr.

**fumosa*, Turn. P.R.S. Tas. 1926, p. 149. Mt. Wellington, 3,500 ft.; Lake Fenton, 3,500 ft.

Thalerotricha, Meyr.

mylicella, Meyr. P.L.S.N.S.W. 1884, p. 741. Launceston; Deloraine.

Antiopala, Meyr.

**tephræa*, Meyr. P.L.S.N.S.W. 1888, p. 1647. Mt. Wellington; Deloraine.

Zacorus, Butl.

**pura*, Meyr. P.L.S.N.S.W. 1884, p. 722. Hobart; Deloraine.

cara, Butl. P.L.S.N.S.W. 1884, p. 740. Hobart; Deloraine.

Protomacha, Meyr.

chalchaspis, Meyr. P.L.S.N.S.W. 1884, p. 740. Hobart.

Enchronista, Meyr.

**bathrosticha*, Turn. P.R.S. Tas. 1926, p. 150. Russell Falls.

Chezala, Wlk.

**glaphyropla*, Meyr. P.L.S.N.S.W. 1884, p. 735. Hobart.

**liopa*, Turn. P.R.S. Tas. 1926, p. 150. Cradle Mountain, 3,000 ft.

**Oresitropha*, Turn.

**melanotypa*, Turn. P.R.S. Tas. 1926, p. 151. Cradle Mountain, 3,000 ft.

Tanyzancla, Meyr.

marionella, Newm. P.L.S.N.S.W. 1884, p. 728. Epping.

Opsitycha, Meyr.

squalidella, Meyr. P.L.S.N.S.W. 1883, p. 496. Hobart; St. Helen's; Launceston.

Pyrgoptila, Meyr.

**callidesma*, Low. Tr. R.S.S.A. 1894, p. 96. Windermere.

Latometus, Butl.

barysoma, Meyr. P.L.S.N.S.W. 1883, p. 383. Deloraine.

Philobota, Meyr.

auriceps, Butl. P.L.S.N.S.W. 1883, p. 478. Hobart; Lake Fenton, 3,500 ft.; Launceston; Cradle Mountain, 3,000 ft.

**phœnopasta*, Turn. P.R.S. Tas. 1926, p. 151. Mt. Wellington, 4,000 ft.; Lake Fenton, 3,500 ft.

**nephelarcha*, Meyr. P.L.S.N.S.W. 1883, p. 483. Deloraine.

crepera, Meyr. P.L.S.N.S.W. 1883, p. 484. Bothwell; Launceston; Beaconsfield.

mœstella, Wlk. Cat. Brit. Mus. XXIX., p. 648.

olympias, Meyr. 1888, p. 1610. Hobart; Launceston; Strahan.

**rasilis*, Turn. P.R.S. Tas. 1926, p. 152. Hobart.

**madida*, Meyr. Exot. Micro. II., p. 384. Hobart.

atmobola, Meyr. P.L.S.N.S.W. 1883, p. 486. Hobart; Russell Falls, Campbell Town; St. Helen's; Launceston; Deloraine; Wilmot; Cradle Mountain, 3,000 ft.

leucomitra, Meyr. P.L.S.N.S.W. 1883, p. 488. Mt. Wellington.

**lissopolia*, Turn. P.R.S. Tas. 1926, p. 152. Rosebery.

**ethnitis*, Meyr. Exot. Micro. II., p. 384. Hobart; Bothwell; Rosebery.

orescoa, Meyr. P.L.S.N.S.W. 1883, p. 376. St. Helen's.

**microschema*, Meyr. P.L.S.N.S.W. 1883, p. 380. Mt. Wellington; Cradle Mountain, 3,000 ft.

protorthra, Meyr. P.L.S.N.S.W. 1883, p. 378. Mt. Wellington, 1,000-3,000 ft.; Lake Fenton, 3,500 ft.; Cradle Mountain, 3,000 ft.

**gypsomera*, Lcw. Tr. R.S.S.A. 1920, p. 62. Hobart.

**ærolias*, Meyr. P.L.S.N.S.W. 1888, p. 1612. Deloraine.

erythrotænia, Wlgrn. P.L.S.N.S.W. 1883, p. 499 (*pretiosella*). Hobart; St. Helen's; Launceston; Strahan.

anachorda, Meyr. P.L.S.N.S.W. 1883, p. 499. Zeehan.

**placochorda*, Turn. P.R.S. Tas. 1926, p. 152. Bothwell.

charaxias, Meyr. P.L.S.N.S.W. 1888, p. 1641. Launceston; Rosebery; Zeehan.

**niphias*, Meyr. P.L.S.N.S.W. 1884, p. 730. Hobart.

**hyphanta*, Turn. P.R.S. Tas. 1926, p. 153. Lake Fenton, 3,500 ft.

metachroa, Meyr. P.L.S.N.S.W. 1888, p. 1616. Cradle Mountain, 3,000 ft.

aurinatella, Wlk. P.L.S.N.S.W. 1883, p. 504. St. Helen's; Beaconsfield; Cradle Mountain, 3,000 ft.

euxantha, Meyr. P.L.S.N.S.W. 1883, p. 505. Hobart; St. Helen's; St. Mary's; Launceston; Beaconsfield.

cirrhodes, Meyr. Exot. Micro. I., p. 126.

occidua, Meyr. P.L.S.N.S.W. 1883, p. 507. Hobart.

dejunctella, Wlk. P.L.S.N.S.W. 1882, p. 452. Beaconsfield.

**crypsileuca*, Meyr. P.L.S.N.S.W. 1884, p. 732. Mt. Wellington, 2,500-3,000 ft.

**poliocneca*, Turn. P.R.S. Tas. 1926, p. 153. Cradle Mountain, 3,000 ft.

**cataxera*, Meyr. P.L.S.N.S.W. 1884, p. 736. Mt. Wellington, 2,500 ft.; Russell Fall,; Lake Fenton, 3,500 ft.; Deloraine.

**micranepsia*, Turn. P.R.S. Tas. 1926, p. 153. Lake Fenton, 3,500 ft.; Cradle Mountain, 3,000 ft.

**ceratina*, Meyr. P.L.S.N.S.W. 1884, p. 737. Mt. Wellington, 2,500 ft.

cinetica, Meyr. P.L.S.N.S.W. 1884, p. 738. Hobart.

**pandora*, Turn. Tr. R.S.S.A. 1917, p. 84. Mt. Wellington, 2,500 ft.; Lake Fenton, 3,500 ft.; Cradle Mountain, 3,000 ft.

Leistomorpha, Meyr.

brontoscopa, Meyr. P.L.S.N.S.W. 1883, p. 510. Hobart; Launceston.

Chrysonoma, Meyr.

atricollis, Meyr. P.L.S.N.S.W. 1884, p. 726. Launceston; Beaconsfield.

fascialis, Fab. P.L.S.N.S.W. 1883, p. 506 *(bimaculana)*. Launceston; Beaconsfield.

protophaës, Meyr. P.L.S.N.S.W. 1882, p. 457. Campbell Town.

Zonopetala, Meyr.

erythrosema, Meyr. P.L.S.N.S.W. 1885, p. 829. Hobart; Russell Falls; St. Helen's.

quadripustulella, Wlk. P.L.S.N.S.W. 1882, p. 466. Launceston.

Compsotropha, Meyr.

strophiella, Meyr. P.L.S.N.S.W. 1883, p. 513. Deloraine.

Heliocausta, Meyr.

euselma, Meyr. P.L.S.N.S.W. 1882, p. 482. Hobart; Bothwell; Launceston; Beaconsfield; Rosebery.

parthenopa, Meyr. P.L.S.N.S.W. 1882, p. 481, Hobart; Bothwell; Beaconsfield.

hemiteles, Meyr. P.L.S.N.S.W. 1882, p. 475. Hobart; Launceston.

elæodes, Meyr. P.L.S.N.S.W. 1882, p. 474. Hobart; Launceston.

triphænatella, Wlk. P.L.S.N.S.W. 1882, p. 477. Bothwell.

mimica, Meyr. P.L.S.N.S.W. 1887, p. 934. Hobart; Bothwell; Launceston.

cœnosa, Meyr. P.L.S.N.S.W. 1882, p. 506. Hobart; Launceston.

Lepidotarsa, Meyr.

**tritoxantha*, Meyr. P.L.S.N.S.W. 1885, p. 828. Deloraine.

chrysopoca, Meyr. P.L.S.N.S.W. 1882, p. 477. Hobart; Russell Falls; Launceston; Deloraine.

Eochrois, Meyr.

**cirrhophara*, Turn. P.R.S. Tas. 1926, p. 154. Rosebery; Zeehan, Strahan.

Epicurica, Meyr.

callianassa, Meyr. P.L.S.N.S.W. 1882, p. 450. Campbell Town; St. Helen's; Launceston; Deloraine.

Zelotechna, Meyr.

falcifera, Meyr. P.L.S.N.S.W. 1882, p. 440. St. Helen's.

Wingia, Wlsm.

aurata, Wlk. P.L.S.N.S.W. 1882, p. 427. Launceston; Beaconsfield.

hesperidella, Meyr. P.L.S.N.S.W. 1882, p. 429. Hobart; Lake Fenton, 3,500 ft.; Zeehan; Strahan.

Tortricopsis, Newm.

uncinella, Zel. P.L.S.N.S.W. 1882, p. 437. Hobart; Mt. Wellington; Russell Falls; Bothwell; St. Helen's; Launceston; Deloraine; Rosebery; Zeehan; Strahan.

euryphanella, Meyr. P.L.S.N.S.W. 1882, p. 435. Hobart; Russell Falls; St. Helen's; Launceston; Wilmot.

**mesophthora*, Meyr. P.L.S.N.S.W. 1885, p. 825. Mt. Wellington, 2,500 ft.; Deloraine.

Arachnographa, Meyr.

micrastrella, Meyr. P.L.S.N.S.W. 1882, p. 433. St. Helen's; Launceston.

Meleonoma, Meyr.

**psammota*, Meyr. Exot. Micro. I., p. 304. St. Helen's.

Eupselia, Meyr.

melanostrepta, Meyr. P.L.S.N.S.W. 1880, p. 223. Hobart.

percussana, Wlk. P.L.S.N.S.W. 1880, p. 219.

satrapella, Meyr. P.L.S.N.S.W. 1880, p. 220. Launceston.

carpocapsella, Wlk. P.L.S.N.S.W. 1880, p. 219. Hobart; Mt. Wellington; Cradle Mountain.

Machetis, Meyr.

aphrobola, Meyr. P.L.S.N.S.W. 1883, p. 331. Hobart; Campbell Town; Beaconsfield.

Sphyrelata, Meyr.

ochrophæa, Meyr. P.L.S.N.S.W. 1883, p. 361. Hobart; Launceston; Wilmot.

Thudaca, Wlk.

trabeata, Meyr. P.L.S.N.S.W. 1892, p. 578. Hobart; Russell Falls; St. Helen's; Rosebery; Zeehan; Strahan.

obliquella, Wlk. P.L.S.N.S.W. 1892, p. 575. Hobart; Russell Falls; St. Helen's; Rosebery; Zeehan; Strahan.

crypsidesma, Meyr. P.L.S.N.S.W. 1892, p. 572. Cradle Mountain, 3,000 ft.; Strahan.

**innubila*, Turn. P.R.S. Tas. 1926, p. 154. Rosebery; Zeehan; Strahan.

Eutorna, Meyr.

**leptographa*, Meyr. Tr. R.S.S.A. 1906, p. 41. Swansea; Campbell Town; Launceston; Cradle Mountain, 3,000 ft.

intonsa, Meyr. Tr. R.S.S.A. 1906, p. 42. Campbell Town.

eurygramma, Meyr. Tr. R.S.S.A. 1906, p. 43. Launceston; Wilmot; Moina, 2,000 ft.; Burnie; Strahan.

spintherias, Meyr. Tr. R.S.S.A. 1906, p. 44. Launceston; Deloraine.

diaula, Meyr. Tr. R.S.S.A. 1906, p. 45. Russell Falls; Campbell Town; St. Helen's; Launceston; Wilmott; Zeehan; Strahan.

**phaulocosma*, Meyr. Tr. R.S.S.A. 1906, p. 45. Mt. Wellington; Lake Fenton, 3,500 ft.; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.; Wilmot; Zeehan; Strahan.

Cryptolechia, Zel.

**lutea*, Turn. P.R.S. Tas. 1926, p. 154. Rosebery.

**argillea*, Turn. P.R.S. Tas. 1926, p. 155. Rosebery.

humerana, Wlk. Tr. R.S.S.A. 1902, p. 158. Bothwell; Launceston; Beaconsfield.

lewinella, Newm. Tr. R.S.S.A. 1894, p. 112 (*neurosticha*). Ross; Launceston.

**tripunctella*, Wlk. Tr. R.S.S.A. 1917, p. 118. Hobart; Epping; Launceston.

**empalacta*, Meyr. Exot. Micro. I., p. 305. Lake Fenton, 3,500 ft.; Launceston; Cradle Mountain, 3,000 ft.

radiosella, Wlk. Tr. R.S.S.A. 1906, p. 48. Launceston.

**illepida*, Turn. P.R.S. Tas. 1926, p. 155. Russell Falls.

HELIODINIDÆ.

Stathmopoda, Sttn.

melanochra, Meyr. P.L.S.N.S.W. 1897, p. 321. Hobart; Campbell Town; Launceston; Deloraine.

lethonoa, Meyr. P.L.S.N.S.W. 1897, p. 322. Hobart.

chalybeis, Meyr. P.L.S.N.S.W. 1897, p. 322. Hobart.

acontias, Meyr. P.L.S.N.S.W. 1897, p. 318. Hobart; Russell Falls; Launceston; Deloraine; Strahan.

cyanopla, Meyr. P.L.S.N.S.W. 1897, p. 319. Deloraine.

**cephalæa*, Meyr. P.L.S.N.S.W. 1897, p. 319. Hobart.

astrapeis, Meyr. P.L.S.N.S.W. 1897, p. 320. Campbell Town.

**mesombra*, Meyr. P.L.S.N.S.W. 1897, p. 320. Hobart; Launceston.

hyposcia, Meyr. P.L.S.N.S.W. 1897, p. 320. Hobart.

iodes, Meyr. P.L.S.N.S.W. 1897, p. 323. Deloraine.

crocophanes, Meyr. P.L.S.N.S.W. 1897, p. 324. Hobart; St. Helen's.

liporrhoa, Meyr. P.L.S.N.S.W. 1897, p. 326. Launceston.

**Leuroscelis*, Turn.

**coracopis*, Turn. P.R.S. Tas. 1926, p. 155. Moina, 2,000 ft.

Pachyrhabda, Meyr.

steropodes, Meyr. P.L.S.N.S.W. 1897, p. 312. Mt. Wellington.

GLYPHIPTERYGIDÆ.

Cebysa, Wlk.

leucoteles, Wlk. P.L.S.N.S.W. 1907, p. 93. Hobart; Dunalley; Launceston; Beaconsfield.

* *Cylicophora*, Turn.

**collina*, Turn. P.R.S. Tas. 1926, p. 156. Cradle Mountain, 3,000 ft.

Choreutis, Hb.

homotypa, Meyr. P.L.S.N.S.W. 1907, p. 109. Hobart; Russell Falls; St. Helen's; Deloraine; Wilmot; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.

lampadias, Meyr. P.L.S.N.S.W. 1907, p. 110. Hobart; Mt. Wellington, 2,500 ft.; Russell Falls; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.

Glyphipteryx, Hb.

acinacella, Meyr. P.L.S.N.S.W. 1882, p. 193. Deloraine.

gonoteles, Meyr. P.L.S.N.S.W. 1907, p. 119. Deloraine.

**haplographa*, Turn. P.R.S. Tas. 1926, p. 157. Zeehan.

palæomorpha, Meyr. P.L.S.N.S.W. 1880, p. 242. Hobart; St. Helen's; Deloraine.

**macraula*, Meyr. P.L.S.N.S.W. 1907, p. 120. Deloraine; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.

euthybelemna, Meyr. P.L.S.N.S.W. 1880, p. 250. Hobart; Launceston; Deloraine.

platydisema, Low. Tr. R.S.S.A. 1893, p. 183. Deloraine.

meteora, Meyr. P.L.S.N.S.W. 1880, p. 237. Hobart; Campbell Town; Launceston; Deloraine.

chrysoplanetis, Meyr. P.L.S.N.S.W. 1880, p. 238. Hobart; Campbell Town; St. Helen's; Deloraine.

leucocerastes, Meyr. P.L.S.N.S.W. 1880, p. 239. Launceston.

**tetrasema*, Meyr. P.L.S.N.S.W. 1882, p. 191. Mt. Wellington; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.; Guildford, 2,000 ft.; Rosebery; Zeehan; Strahan.

**holodesma*, Meyr. P.L.S.N.S.W. 1882, p. 190. Hobart; Mt. Wellington; Cradle Mountain, 3,000 ft.

drosophaës, Meyr. P.L.S.N.S.W. 1880, p. 249. Deloraine.

isozela, Meyr. P.L.S.N.S.W. 1907, p. 124. Deloraine; Moina, 2,000 ft.; Cradle Mountain, 3,000 ft.

asteriella, Meyr. P.L.S.N.S.W. 1880, p. 235. Bothwell.

argyrosema, Meyr. P.L.S.N.S.W. 1880, p. 247. Campbell Town.

calliscopa, Low. Tr. R.S.S.A. 1905, p. 112. Hobart.

cometophora, Meyr. P.L.S.N.S.W. 1880, p. 231. St. Helen's.

**leucargyra*, Turn. P.R.S. Tas. 1926, p. 157. Cradle Mountain, 3,000 ft.; Rosebery; Zeehan.

**gypsonota*, Turn. P.R.S. Tas. 1926, p. 158. Rosebery.

leucoplaca, Turn. P.L.S.N.S.W. 1913, p. 217. Hobart.

gemmipunctella, Wlk. P.L.S.N.S.W. 1880, p. 239 (*chrysolithella*). St. Helen's.

**chalcostrepta*, Meyr. P.L.S.N.S.W. 1907, p. 128. Deloraine.

tripselia, Meyr. P.L.S.N.S.W. 1907, p. 129. Cradle Mountain, 3,000 ft.

HYPONOMEUTIDÆ.

Zelleria, Sttn.

citrina, Meyr. P.L.S.N.S.W. 1892, p. 586. Mt. Wellington, 2,500 ft.; Moina, 2,000 ft.; Zeehan.

mystarcha, Meyr. P.L.S.N.S.W. 1892, p. 586. Hobart; Campbell Town; Cradle Mountain, 3,000ft.; Zeehan.

callidoxa, Meyr. P.L.S.N.S.W. 1892, p. 584. Hobart.

memorella, Meyr. P.L.S.N.S.W. 1892, p. 583. Hobart; St. Helen's; Cradle Mountain, 3,000 ft.

Thereutis, Meyr.

chionozyga, Meyr. P.L.S.N.S.W. 1892, p. 597. St. Helen's.

**Pauridioneura*, Turn.

**acrospila*, Turn. P.R.S. Tas. 1926, p. 159. Lake Fenton, 3,500 ft.

Chionogenes, Meyr.

**isanema*, Meyr. P.L.S.N.S.W. 1907, p. 84. Mt. Wellington, 2,500 ft.

Charicrita, Meyr.

**othonina*, Turn. P.R.S. Tas. 1926, p. 159. Strahan.

AMPHITHERIDÆ.

Amphithera, Meyr.

heteromorpha, Meyr. P.L.S.N.S.W. 1892, p. 597. St. Helen's.

**Chalcoteuches*, Turn.
**phlogera*, Turn. P.R.S. Tas. 1926, p. 160. Cradle Mountain, 3,000 ft.

COPROMORPHIDÆ.

Hypertropha, Meyr.
tortriciformis, Gn. P.L.S.N.S.W. 1880, p. 209 *(thesaurella)*. Hobart; Bothwell; Beaconsfield; Rosebery; Strahan.

GRACILARIADÆ.

**Aristæa*, Meyr.
**periphanes*, Meyr. P.L.S.N.S.W. 1907, p. 52. Mt. Wellington, 2,500-3,000 ft.

Acrocercops, Wlgrn.
heliopla, Meyr. P.L.S.N.S.W. 1907, p. 57. Hobart.
laciniella, Meyr. P.L.S.N.S.W. 1880, p. 164. Hobart; Campbell Town; Launceston; Deloraine; Cradle Mountain, 3, 000 ft.

Cyphosticha, Meyr.
**ostracodes*, Turn. P.R.S.Q. 1917, p. 88. Cradle Mountain, 3,000ft.
**zophonota*, Turn. P.R.S. Tas. 1926, p. 159. Cradle Mountain, 3,000 ft.

Gracilaria, Haw.
**cirrhopis*, Meyr. P.L.S.N.S.W. 1907, p. 66. St. Helen's.

PLUTELLIDÆ.

Phalangitis, Meyr.
crymorrhoa, Meyr. P.L.S.N.S.W. 1907, p. 136. Mt. Wellington.
tumultuosa, Meyr. P.L.S.N.S.W. 1907, p. 137. Cradle Mountain, 3,000 ft.
veterana, Meyr. P.L.S.N.S.W. 1907, p. 138. Rosebery; Zeehan.

Plutella, Schrank.
maculipennis, Curt. Tr. N.Z. Inst. 1885, p. 177 *(cruciferarum)*. Universally distributed. *(Introduced.)*

TINEIDÆ.

Erechthianæ.

Arctocoma, Meyr.
ursinella, Meyr. P.L.S.N.S.W. 1880, p. 171. Launceston.

Bucculatrix, Zel.

asphyctella, Meyr. P.L.S.N.S.W. 1880, p. 181. Deloraine.

Leucoptera, Hb.

chalcocyela, Meyr. P.L.S.N.S.W. 1882, p. 201. Mt.

**deltidias*, Meyr. Tr. R.S.S.A. 1906, p. 61. Hobart; Wellington, 2-2,500 ft.; Launceston; Burnie. Mt. Wellington, 2,500 ft.

Cateristis, Meyr.

eustyla, Meyr. Tr. N.Z. Inst. 1888, p. 164. Hobart.

Lyonetia, Hb.

sulfuratella, Meyr. P.L.S.N.S.W. 1880, p. 172. Campbell Town; St. Helen's; Launceston; Deloraine.

**Epicnistis*, Meyr.

**euryscia*, Meyr. Tr. R.S.S.A. 1906, p. 65. Mt. Wellington.

Opostega, Zel.

basilissa, Meyr. P.L.S.N.S.W. 1892, p. 606. Deloraine.

**chalinias*, Meyr. P.L.S.N.S.W. 1892, p. 607. St. Helen's.

Bedellia, Sttn.

somnulentella, Zel. P.L.S.N.S.W. 1880, p. 170. Hobart. *(Introduced.)*

Opogona, Zel.

comptella, Wlk. P.L.S.N.S.W. 1897, p. 416. Hobart; Russell Falls; Bothwell; Launceston; Beaconsfield.

stereodyta, Meyr. P.L.S.N.S.W. 1897, p. 417. Hobart; Campbell Town; St. Helen's; Launceston.

protodoxa, Meyr. P.L.S.N.S.W. 1897, p. 418. Hobart; Campbell Town; Launceston.

stenocraspeda, Meyr. P.L.S.N.S.W. 1897, p. 419. Hobart; Campbell Town; Launceston; Deloraine.

Dascia, Meyr.

sagittifera, Meyr. P.L.S.N.S.W. 1892, p. 579. Hobart; Launceston.

Comodica, Meyr.

mystacinella, Wlk. P.L.S.N.S.W. 1880, p. 263. Hobart; Launceston.

Erechthias, Meyr.

symmacha, Meyr. P.L.S.N.S.W. 1892, p. 564. St. Helen's; Launceston; Deloraine.

Nematobola, Meyr.

orthotricha, Meyr. P.L.S.N.S.W. 1892, p. 592. St. Helen's.

Dryadaula, Meyr.

**napæa*, Meyr. Tr. E.S. 1905, p. 244. Deloraine.

Tineinæ.

Ctenocompa, Meyr.

baliodes, Meyr. P.L.S.N.S.W. 1892, p. 489. Hobart; Launceston; Beaconsfield.

Lepidoscia, Meyr.

tyrobathra, Meyr. P.L.S.N.S.W. 1892, p. 511. Launceston.

arctiella, Wlk. P.L.S.N.S.W. 1892, p. 508 *(comochora)*. Launceston.

**sciodesma*, Meyr. P.L.S.N.S.W. 1892, p. 512. Hobart; Deloraine.

**amphiscia*, Meyr. P.L.S.N.S.W. 1892, p. 513. Deloraine.

Narycia, Stph.

glabrella, Wlk. P.L.S.N.S.W. 1892, p. 492. Launceston.

**phaulodes*, Meyr. P.L.S.N.S.W. 1892, p. 499. Hobart.

cataphracta, Meyr. P.L.S.N.S.W. 1892, p. 504. Hobart; Launceston.

**retinochra*, Low. P.R.S. Tas. 1926, p. 160. Hobart; Bothwell; Launceston; Rosebery; Strahan.

**toxoteuches*, Turn. P.R.S. Tas. 1926, p. 161. Cradle Mountain, 3,000 ft.

protorna, Meyr. P.L.S.N.S.W. 1892, p. 495. Launceston.

adelopis, Meyr. P.L.S.N.S.W. 1892, p. 496. Launceston; Beaconsfield.

guildingi, Scott. P.L.S.N.S.W. 1892, p. 497. Hobart; Launceston.

**euctena*, Turn. P.R.S. Tas. 1926, p. 161. Hobart.

Lindeera, Blanch.

tessalatella, Blanch. Tr. R.S.S.A. 1896, p. 66 *(calcularis)*. Launceston. *(Introduced.)*

Mesopherna, Meyr.

palustris, Meyr. P.L.S.N.S.W. 1892, p. 515. Launceston; Deloraine.

Mœrarchis, Meyr.

australasiella, Don. P.L.S.N.S.W. 1892, p. 521. St. Helen's.

inconcisella, Wlk. P.L.S.N.S.W. 1892, p. 522. Hobart; Launceston.

**lapidea*, Turn. P.R.S. Tas. 1926, p. 161. Strahan.

Monopis, Hb.

ethelella, Newm. P.L.S.N.S.W. 1892, p. 528. Hobart; Mt. Wellington, 2,500 ft.; Lake Fenton, 3,500 ft.; St. Helen's; Launceston; Wilmot; Burnie; Rosebery.

crocicapitella, Clem. P.L.S.N.S.W. 1892, p. 529 (*ferruginella*). Hobart; Strahan. (*Introduced.*)

nivibractella, Wlk. Mem. Nat. Mus. Melb. IV., p. 6. Launceston.

Trichophaga, Rag.

tapetiella, Lin. P.L.S.N.S.W. 1892, p. 535. Hobart; Launceston. (*Introduced.*)

Tineola, H-Sch.

biselliella, Hummel. P.L.S.N.S.W. 1892, p. 554. Hobart. (*Introduced.*)

Tinea, Lin.

fuscipunctella, Haw. P.L.S.N.S.W. 1892, p. 534. Campbell Town; St. Helen's; Launceston; Deloraine. (*Introduced.*)

**corynephora*, Turn. P.R.S. Tas. 1926, p. 162. Mt. Wellington, 2,500 ft.

**poryhyrota*, Meyr. P.L.S.N.S.W. 1892, p. 538. Deloraine.

chaotica, Meyr. P.L.S.N.S.W. 1892, p. 538. Mt. Wellington; Deloraine.

monophthalma, Meyr. P.L.S.N.S.W. 1892, p. 543. Hobart; Huon River; Deloraine.

phauloptera, Meyr. P.L.S.N.S.W. 1892, p. 544. Deloraine.

nectarea, Meyr. P.L.S.N.S.W. 1892, p. 546. St. Helen's.

irruptella, Wlk. P.L.S.N.S.W. 1892, p. 550. Hobart; Launceston; Deloraine.

ochranthes, Meyr. P.L.S.N.S.W. 1892, p. 552. Hobart; Campbell Town; St. Helen's; Beaconsfield; Deloraine.

Timæa, Wlk.

bivittatella, Wlk. P.L.S.N.S.W. 1892, p. 568. St. Helen's; Strahan.

Adelinæ.

Nemotois, Hb.

topazias, Meyr. P.L.S.N.S.W. 1892, p. 485. St. Helen's.

orichalchias, Meyr. P.L.S.N.S.W. 1892, p. 484. Hobart; Launceston.

sparsella, Wlk. P.L.S.N.S.W. 1892, p. 483. Hobart; Launceston; Beaconsfield.

COSSOIDEA.

Cossidæ.

**Idioses*, Turn.

**littleri*, Turn. P.R.S. Tas. 1926, p. 163. Launceston.

Xyleutes, Hb.

liturata, Don. Ins. New Holland, p. 42. Hobart; Russell Falls; Launceston; Strahan; Ulverstone.

Culama, Wlk.

australis, Wlk. Cat. Brit. Mus. VII., p. 1525. Hobart; Cradle Mountain, 3,000 ft.

**caliginosa*, Wlk. Cat. Brit. Mus. VII., p. 1522.

HOMONEURA.

HEPIALOIDEA.

Hepialidæ.

Porina, Wlk.

fuscomaculata, Wlk. P.L.S.N.S.W. 1889, p. 1120. Hobart; Launceston; George Town.

**australis*, Wlk. P.L.S.N.S.W. 1889, p. 1121. Sheffield.

dirempta, Wlk. P.L.S.N.S.W. 1889, p. 1121. Strahan.

rufescens, Wlk. P.L.S.N.S.W. 1889, p. 1122. Hobart; Launceston.

**subvaria*, Wlk. P.L.S.N.S.W. 1889, p. 1123. Launceston; Ulverstone.

**sphragidias*, Meyr. P.L.S.N.S.W. 1889, p. 1123. Launceston; Maitland.

Oncopera, Wlk.

intricata, Wlk. P.L.S.N.S.W. 1889, p. 1124. Hobart; Swansea; Maria Island; Bothwell; Scottsdale; Launceston; Deloraine; Moina, 2,000ft.

Hectomanes, Meyr.

simulans, Wlk. P.L.S.N.S.W. 1889, p. 1126. Hobart; Ross; Launceston.

rufula, Turn. P.R.S. Tas. 1926, p. 163. Hobart.

pteromela, Low. Tr. R.S.S.A. 1892, p. 5. Hobart; Dunalley; Maria Island; Launceston.

**pelagia*, Turn. P.R.S. Tas. 1926, p. 164. Strahan.

Hepialus, Fab.

lignivorus, Lewin. P.L.S.N.S.W. 1889, p. 1129. Hobart; Beaconsfield.

Pielus, Wlk.

hyalinatus, H-Sch. P.L.S.N.S.W. 1889, p. 1134. Mt. Wellington; Lake Fenton, 3,500 ft.; Zeehan.

imperialis, Olliff. P.L.S.N.S.W. 1887, p. 1015. Launceston.

Trictena, Meyr.

labyrinthica, Don. P.L.S.N.S.W. 1889, p. 1135. Launceston.

TASMANIAN PHYSIOGRAPHY.

Discussion on "Note on the Isostatic Background of Tasmanian Physiography," by A. N. Lewis.

[Papers and Proceedings of the Royal Society of Tasmania, 1926, p. 1.] (11th April, 1927.)

Plates XV.-XX.

(Read 12th September, 1927.)

Mr. P. B. NYE, M.Sc., B.M.E., Government Geologist.

Like Mr. Lewis, I only desire to set forth my views as a contribution to Tasmanian geology. I cannot see eye to eye with Mr. Lewis in many points in his paper and particularly in regard to some of the major conclusions.

In the first place, in view of Dr. Walkom's papers on the Mesozoic fossil flora of Tasmania (Walkom, 1924-1925), I think we ought to drop the term Jurassic as applied to any rocks in Tasmania. Fossil evidence points rather to their being Triassic and this period will probably be found to include the whole sandstone series. Dolerite intrusions occurred throughout the world at this time and Du Toit puts them in the Upper Triassic. We may therefore consider with a reasonable degree of certainty that the date of the diabase intrusions in Tasmania was late Triassic and that we have no more recent sedimentary rocks except the small patches of Tertiary deposits. In regard to the classification of the sedimentary series particularly dealt with in Mr. Lewis's paper, this cannot be regarded as wholly fixed. For example, near Mt. Nicholas a coal seam occurs beneath some limestone beds. Is this a member of the Greta series or have we an upper limestone above the Greta series? I do not think that the Knocklofty Sandstones are higher than the felspathic sandstones and at present they appear to resemble the Ross series but I would like to undertake further field work before definitely arriving at the above conclusion. Also, it cannot be said that the whole sedimentary series represents a continual and unbroken era of deposition. At Glen Morey, York Plains and Jericho, a bed containing pebbles belonging to the Lower Marine series is included in the felspathic series. This indicates the occur-

rence of differential earth movements at some time between Permo-Carboniferous and felspathic sandstone deposition.

In regard to the diabase, the opinions of the Geological Survey in 1922 quoted by Mr. Lewis require some explanation. During the work in the Midlands undertaken when compiling my report on the Underground Water Resources of Tasmania, I came to certain conclusions. Later the Survey undertook the work referred to, *The Coal Resources of Tasmania*. At the same time as I was working in the Midlands, Mr. Keid was working on the East Coast and Mr. Reid in the South. Mr. Hills wrote up the results of our investigations and, without consulting me, included my opinion of the structure of the Midlands in a general statement intended to apply to the whole of Tasmania. Mr. Lewis is now doing a similar thing by applying his knowledge of the south-eastern districts to the whole of Tasmania. This is a procedure against which I should like to warn him.

My original statement, the one which Mr. Hills repeated, is true for the Midlands but in areas in which older rocks outcrop it is an entirely different matter. We must distinguish between these two cases which are entirely separate. When a basement of earlier Palæozoic rocks can be seen, the conditions are very different from those pertaining in the Midlands and eastern portion of the island where the series under discussion (Permo-Carboniferous to Triassic) is much thicker.

Turning to the most controversial portion of Mr. Lewis's paper, I cannot agree that the faulting occurred towards the early Pleistocene and adhere to my previously published opinion that the origin of our present physiography dates from the time of the diabase intrusions. I will deal with the data Mr. Lewis puts forward on p. 17 of his paper in support of his view.

1. As to the features of our greater valleys I merely say "which do not possession the characteristics of water "erosion."

2. I repeat my views published in Underground Water Resources Paper No. 1 and No. 2 and elaborated in the diagrams attached thereto. "All these intrusive masses have "the appearance of arising from a large underlying mass "situated at no very great depth below the surface. . . . . "These intrusions were closely connected with much-fault-"ing in the strata, and both these events are probably con-"temporaneous with the cessation of deposition of the Trias-

"Jura sediments and their elevation by earth movements. ". . . . The intrusion of the diabase was followed by a "long period of denudation which, in most portions of the "area, has continued uninterruptedly up to the present time "and has been mainly responsible for the productions of the "present topographical features."

In several places I have seen definite proof that this was so. For instance, narrow dykes with different sedimentary rocks on each side, indicating a fault through which the diabase welled up. We do see the core of diabase and the remains of the retaining wall of sedimentary rocks on the sides of the highest mountains. There certainly is no trace of an overflow as far as our present evidence extends. Many thousands of feet of covering rock have since been removed by erosion.

3. I do not think Mr. Lewis means this. If a sill occurs as he states it surely must determine the form of the mountain.

4. I agree that where there is a sill, sedimentary rocks below it cannot have been raised by that sill. Any elevation of such rock would be caused by the transgressive bodies in the vicinity and not by the overlying sill.

5. I have seen many cases of diabase cutting inclined sedimentary rocks at many different angles up to 90deg. I have also seen a tabular body cutting inclined strata at a very low angle.

6. The mountains have not been in existence since Jurassic times but have been forming since that time and have only now reached their present stage of erosion. The interval of time is not too long considering the many thousands of feet that have been removed. The present configuration of the surface depends entirely on the form assumed by the blocks hoisted up or otherwise by the diabase intrusion and subsequent history has simply been the removal of the sedimentary series from the hard igneous rocks. Cliffs and juvenile drainage quite follow from a normal development since Triassic times by water erosion.

In regard to the Tertiary peneplaination, Mr. Lewis places great reliance on the existence of pebbles of rocks foreign to the neighbourhood over much of the area under discussion. These pebbles certainly do exist but the sources are near at hand. The glacial series is full of such and they are scattered through the remaining members of the

sedimentary series. With the erosion of these rocks the pebbles have accumulated on the surface.

The most convincing argument against Mr. Lewis's views occurs in the Avoca district. There you can find many faults and one with a throw of 2,000 feet but the pebble beds and overlying basalt lie uninterrupted over the top of the fault, indicating a long period of erosion between the faulting period and the deposition of the sediments. This fault is typical of many others occurring in north-eastern Tasmania. This indicates that no differential movement has taken place since the diabase intrusions. This statement is certainly true of the Midlands, East and South-East. It does not necessarily hold good in localities where the older platform has been exposed to view. I do not see any reason to change my previously published views.

Mr. W. H. CLEMES, B.A., B.Sc.

Mr. Clemes identified himself with Mr. Nye's remarks. He also felt that he could not reconcile the field data with Mr. Lewis's theory of Tertiary block faulting. In particular, the diabase we now see must have consolidated at a great depth. This was indicated by the large size of the crystals. The amount of erosion that must have occurred to expose this rock required a much greater time than Mr. Lewis had assigned to it. Mr. Clemes instanced the large size of the crystals on the summit of Mt. Olympus (4,500 feet) and the amount of erosion effected by the Ouse, as compared with the Shannon. He also instanced the beds of pebbles, as at Lindisfarne largely mingled with chips of fossil conifers which were derived from eroded Permo-Carboniferous strata. Mr. Clemes also said that he could not agree that Tasmania had remained nearly at sea level until towards the close of the Tertiary Period, as otherwise, from whence did the sediments come?

Mr. L. F. GIBLIN, D.S.O., M.C., B.A.

Mr. Giblin raised several points, amongst them being—

(1) Is there any necessity to assume a special magma? Will not general isostatic principles sufficiently explain these intrusions?

(2) Can the accordance of mountain tops be taken as evidence of a peneplain? Is this not equally evidence of a similar action all over the country by the diabase magma?

(3) Cannot some finality be reached in regard to the nomenclature of this rock? Should it be called "diabase" or "dolerite"?

In regard to the last point Mr. Lewis explained that the correct petrological classification was "dolerite," and Mr. Nye said that he absolutely agreed but that the word "diabase" had been so long used by the Geological Survey that it was inexpedient to change it.

Professor E. J. C. PITMAN, B.A., B.Sc., also made some remarks from the point of view of mathematics.

Mr. A. N. LEWIS.

Mr. Lewis Replied to the Discussion Generally, but Took Time to Reduce His Reply to Writing, and It was Read (in Title) on 12th September, 1927.

I think this question is of such fundamental importance that no efforts should be spared until it is satisfactorily solved. I greatly admire the work done by Mr. Nye for Tasmanian Geology but at the same time I suggest that the ideas advanced by myself are worthy of more consideration in the light of field evidence than has yet been afforded them.

I unhesitatingly accept Mr. Nye's view that Triassic is the correct correlation of the rocks under discussion. Hitherto the age of the dolerite has been placed as Cretaceous. I suggested that Jurassic was probably more correct than Cretaceous and, for the reasons stated by Mr. Nye, I agree that I was not quite bold enough in my correction.

I cannot agree, however, that there is any marked distinction between the occurrence of the dolerite in the areas in which the older Palæozoic rocks outcrop and those in which they do not. In my view, the localities in which the old early Palæozoic floor of the sedimentary series is exposed are the best places in which to study the occurrences of the dolerite. We must postulate the accumulation of several thousand feet of newer sedimentary rocks on the eroded surface of Cambro-Ordovician, Silurian, or Devonian rocks. This platform was gradually sinking or being pressed downwards. The sedimentation period was suddenly concluded by the inruption of the dolerite through this platform into and perhaps over the newer rocks. To-day, through the combined action of uplift and erosion, the older rocks in some places have been exposed and the way in which the dolerite affected them may be studied. In a few localities this effect may be seen and also remnants of the overlying newer sedimentary series are preserved, enabling the study of the effect of the dolerite on both. It seems

to me that what occurred there probably occurred deep below the present surface of the Midlands plain, the Central Plateau and other localities in which only the upper members of the sedimentary series are exposed. Further, that the true physiographical subdivision of Tasmania is not into areas in which older rocks occur and areas in which dolerite and Permo-Trias sediments predominate, but into elevated tracts and non-elevated tracts, irrespective of their respective constituent rocks.

I now turn to elaborate further the contentions in my paper which Mr. Nye specifically attacks.

1. This question of the ordered sequence of the erosion of our valleys by river erosion was the one which first put me on inquiry in regard to the subject matter at present in dispute. Take first the valley of the South Esk. If we presume an orderly sequence of river erosion we must start with an original plateau. Into this the original rivers must have carved valleys near its edge, presumably near the sea. These valleys would then be widened and deepened and would cut back into the plateau by headward erosion until a sharp divide was all that was left of the original surface. From this divide there would be a traceable sequence of slopes to the eroded plains below. This slope may be irregular and would probably be steep at the head of the valleys and would lessen and widen as the maturer plains were approached. But throughout, a study of the surface should reveal the process whereby the river system has progressively deepened and widened its valley. Instead of such features we see a plain over 50 miles by 30 miles in its widest parts, thoroughly mature in topography and covered with river drifts that have been accumulating through several geological periods. Bounding this plain we have the Central, the Ben Lomond, and the Eastern Tiers Plateaux. These have been barely affected by erosion of the headwaters of the South Esk. Their topography is that of the earliest undefined drainage stage of recent uplift. They meet the mature plain with an escarpment 2,000-4,000 feet high and barely seamed by the rivers flowing over it. This escarpment does not occupy, as a rule, a mile of horizontal distance. To postulate an orderly sequence of river erosion, we must presume a backward regression of almost a cliff face for any distance up to 50 miles over a broad expanse of country without marked erosion of the plateau surface above. The same arguments are applicable to the southern valleys, although here the features are more con-

fused. In the case of the Derwent we would have to imagine that, while the main river could erode a deep valley 150 miles long, its tributaries would leave almost unmarked the bastion of the Mt. Wellington plateau, 4,000 feet high, and with an almost unaffected surface, right at the spot at which the erosion of the river valley must have commenced. The Huon-D'Entrecasteaux Channel valley presents the same problem. It therefore seems to me that our major valleys and plains have not been entirely carved from an original plateau.

2. I absolutely grant and hope that I have never been taken to deny that the dolerite intrusions must have been accompanied by much faulting and that in many places the dolerite intruded upwards through such breaks. My present contention is that any direct effect of this faulting on physiography has been removed by erosion and that our present mountains and plateaux are the result of a second and very much later series of earth movements. Mr. Nye instances examples of considerable faults traversing the Midlands plain. These, I submit, are due to the earlier earth movements. They are apparent to-day as a feature of the largest segment that was not affected by the more recent movements. The fault lines to which I call attention are represented by the escarpments several thousand feet high which bound this block, and I suggest that the existence of faults traversing a block which was not uplifted by more recent movements or one which was so affected do not affect the arguments in favour of such uplift. We do not see any welling up of dolerite through the faults which I ascribe to the more recent phase, and because we see it in the case of the earlier one is not, in my opinion, an argument against the contention that some of this country, faults and all, has been bodily uplifted while other areas have not been so affected.

3. If a sill were intruded below sea level and subsequent deposition demonstrated that the area was below sea level for a long time after the intrusion and, later still, it was elevated into a mountain and the sill thereby exposed, could it be argued that the sill determined the form of the mountain? This has hardly been the case in Tasmania, but I submit that the principle is the same.

4. Mr. Nye's argument under this head is the one he has adopted before but in countless instances I have been unable to find any field evidence of these transgressive bodies. I have followed this point out in very many places

in the field, and feel that in most cases where massive beds of sedimentary rocks flank a dolerite-capped mountain, their existence at their present elevation cannot be due to dolerite below them. To give one or two instances. In the case of Mt. Wellington the sedimentary series is unbroken from just below the Organ Pipes (3,300 feet) down to the Cascades (about 400 feet), and there is no trace of transgressive igneous rock to cause the elevation. The Central Plateau and the Ben Lomond Plateau rest on a foundation of sedimentary rocks. If these rocks have been elevated by dolerite below they would form a curious sandwich with the following arrangement downwards:—Sandstones (small depths but much eroded), dolerite (2,000 feet), mudstones and limestones (1,000-2,000 feet), dolerite (unknown depths). La Pérouse forms the best illustration but I have sufficiently described it earlier.

5. In my original paper the paragraph which is the subject of these remarks is perhaps not expressed to convey my meaning quite accurately enough. It should read, rather: "When a sill can be observed intruding tilted strata "the sill very frequently conforms to the dip of the strata. "It may have been intruded thus but in many cases the field "occurrences give the impression that, subsequently to the in-"trusion, the strata, with the included sill, have both been "tilted." Of course, dyke and laccolith occurrences cut across the strata.

6. Professor Arthur Holmes, in his recently published excellent little book, *The Age of the Earth*, gives the current opinion that from 205 to 290 million years have elapsed since the end of the Triassic Period. Also, on p. 9 he shows that the average rate of erosion is 1 foot every 3,000 years in low-lying country. According to these calculations, after the elevation of our present mountain masses by the dolerite there must have been about 70,000 feet of sediments above the present surface of the mountain plateaux! The considerable elevation and the extreme erosion especially during the ice age would probably require a greater accumulation of rock mass to permit the present mountains existing until the present day. In spite of the erosion of such enormous mountains and in spite of the lapse of such a length of time, the drainage of our plateaux is now so immature that over great areas the direction of the drainage is still undetermined and features of erosion are absent!

The maximum possible covering of sedimentary rock above the present dolerite capping can be approximately

estimated. Dolerite at La Pérouse intrudes the upper levels of the felspathic sandstones; on Mt. Wellington, the lower levels of this series. Similarly on Ben Lomond, and on the Central Plateau and Mt. Field, to give only occasional examples, it occurs near the top of the Ross series. Ample evidence exists to show that the dolerite intruded just as the deposition of the felspathic series as we now see it was concluding, and that there did not exist any great depth of rock above that series. The Geological Survey in *The Coal Resources of Tasmania* give 2,350 feet as the greatest thickness of the Ross series, felspathic sandstone series, and Mt. Nicholas sandstone series together. I think a considerably greater thickness is disclosed at Catamaran. But even putting the original maximum depth of these beds at 5,000 feet it can hardly be conceivable that it would take over 200 million years to erode such soft rocks at such an elevation. The time factor is the most convincing argument I can advance for my proposition and I am content to base my opinion that our physiography was not finally initiated in Triassic times on the view that had this been so the whole country would many periods ago have been reduced to a most mature peneplain. Around Hobart many channels of streams that only flow after heavy rain have been eroded to a depth of 12 feet and more since the land was cleared—say in the last 75 years. The silt that has formed in the Tamar in the same time gives some indication of the effects of erosion. Tertiary basalt (about 30 million years old according to Professor Holmes's calculation) has been cut through to the depth of 200 feet by the Elizabeth River in the Midlands, and by the Forth, Emu, Blythe, and many other rivers of the north coast, all at elevations little above sea level. Could the very little harder dolerite be supposed to stand barely affected for over 200 million years? At the Cataract Gorge, Launceston, the South Esk flows over a bar of extremely hard and coarse dolerite on the top of which are Tertiary pebble beds. Mr. Nye thinks that it is merely superimposed on a mass of dolerite having reached it after eroding through Permo-Carboniferous mudstone, while it seems to me that it is flowing over a late Tertiary fault scarp but in either case it has cut 400 feet or more into the hardest dolerite since the deposition of the Tertiary pebbles, say, in, at very most, 30 million years (although I think 5 million would be nearer the mark). I think this is sufficient indication of the answer to the query of whether the dolerite cappings cf our mountains could persist for 200 million years.

In regard to the pebble beds, I admit the force of Mr. Nye's argument on this point. The explanation of the origin of these pebbles depends on the view adopted as to the sequence of geological events, and therefore their occurrence is of little use in deciphering these events.

In regard to the Avoca fault, I have sufficiently dealt with this point earlier. Obviously, a long interval of time elapsed during which any physiographical features were removed between the occurrence of this fault and the deposition of the covering pebble beds and basalt lava flows. I do not wish in any way to dispute this, but I do say that this fact is no evidence that an existing escarpment 3,000 feet high near by was not caused at a later date.

Passing now to the comments by Mr. Clemes, I can only draw attention again to the fact that must never be lost sight of, namely, that we have in many places occurrences of dolerite which have intruded all strata from the Cambro-Ordovician to the Upper Triassic, and these occurrences show great variations in themselves but no petrographical means of distinguishing between deep-seated intrusions and those which must have occurred near the surface has yet been discovered. Size of crystals as an indication of depth of intrusion is a dangerous guide. No farther away than the Domain a gradation from a glassy, entirely microcrystalline basalt to a coarse holocrystalline dolerite with crystals up to 1cm. in length can be traced in a depth of 200 feet.

I do not suggest that all covering rock must have been eroded since the uplift. On the contrary, I think I have fully explained my opinion that in many cases the sills were exposed and denuded, perhaps as early as the Cretaceous Period. I feel that the case is not that I have not left sufficient time to elapse since the final uplift, but that other workers have not grasped the enormous length of time that has elapsed since Triassic times and the improbability of our mountains persisting since that period. Lastly, Tasmania has only had its present boundaries since Pleistocene times. Pebble beds may have been derived from east, west, or south.

As to Mr. Giblin's remarks, I feel after further thought that his first query is unanswerable, and I must modify my original paper to that extent. There is probably no reason for assuming a "special magma." Relying on Tasmanian evidence alone we could presume an increase in heat due to the effect of radio-active minerals and re-

sulting in a rise in the upper level of the zone of flowage which was relieved by the diastrophic movements of the early Devonian period, evidence of which is visible in our granite batholiths. The remainder of the Devonian and the Carboniferous periods were ages of quiescence. By the Permian the internal heat had so far increased that a more or less perfect isostatic adjustment was possible, which adjustment reached its most perfect balance during the time in which the felspathic sandstone series was deposited, that is, immediately following the dolerite intrusions.

I suggest, that the subsequent happenings were somewhat as follows: Two large adjacent segments foundered, one of these being to the east and south-east and the other to the west and south-west of the present Tasmania. In doing so, they tilted gradually outwards and the results were, firstly a fracturing of the crust over the present location of Tasmania and secondly a gentle squeezing of the subjacent fused rock material towards this fractured zone. This magma, of a basic and wholly undifferentiated facies, then occupied the fissures in the fractured zones caused by the parting of masses of the sedimentary series.

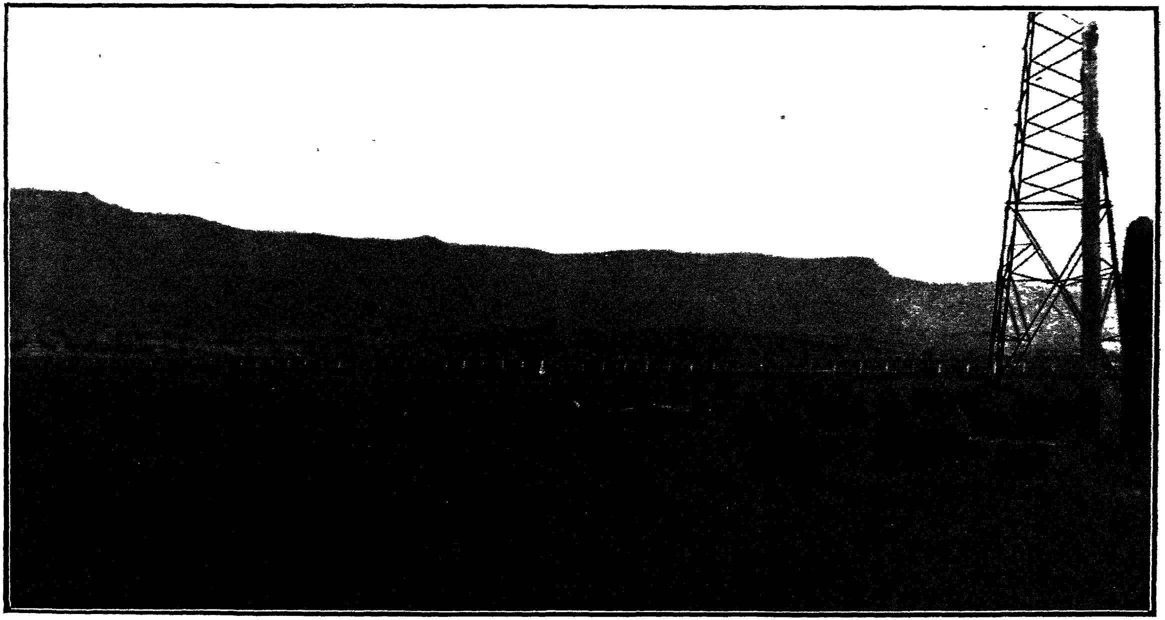
Such an explanation, if confirmed by field evidence, will account for the absence of violence in the intrusion, the presence on different sides of a dyke of rocks of different stratigraphical levels and for the general impression given by the field occurrences of total replacement of some segments by igneous rocks. I must, however, repeat my opinion that all surface features resulting from such disturbances were removed by erosion before the deposition of the Tertiary sediments.

As to Mr. Giblin's second point I merely say: "Perhaps." Accordance of mountain tops is one of the commonest pieces of evidence pointing to the existence of an ancient peneplain.

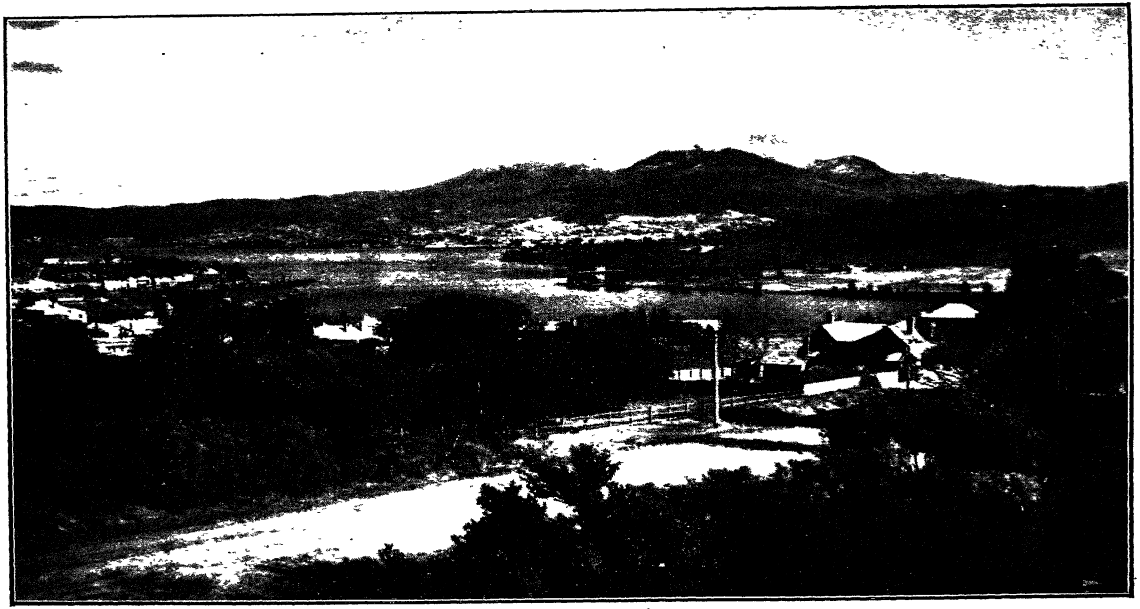
In regard to the terms "dolerite" and "basalt," I merely say that because a term has been used before it was known to be inapplicable is no reason for continuing its use. Far from it being inconvenient to change the accepted nomenclature, it is most inconvenient to have to repeat to every student and visiting geologist that what you are calling diabase is not diabase and everyone, including yourself, knows that it is not diabase but dolerite but because it was once called diabase it would never do to ever commence to call it by its proper name. (For a further account of the history of the use of the terms "dolerite" and "diabase" see Am. Journal of Geology, Vol. 30, No. 3, Apl.-May, 1927).

Brady's Look Out and edge of Central Plateau from North of Arthur Lakes.

A. N. Lewis, photo.



Western Tiers from south of Cressy. A. N. Lewis, photo.

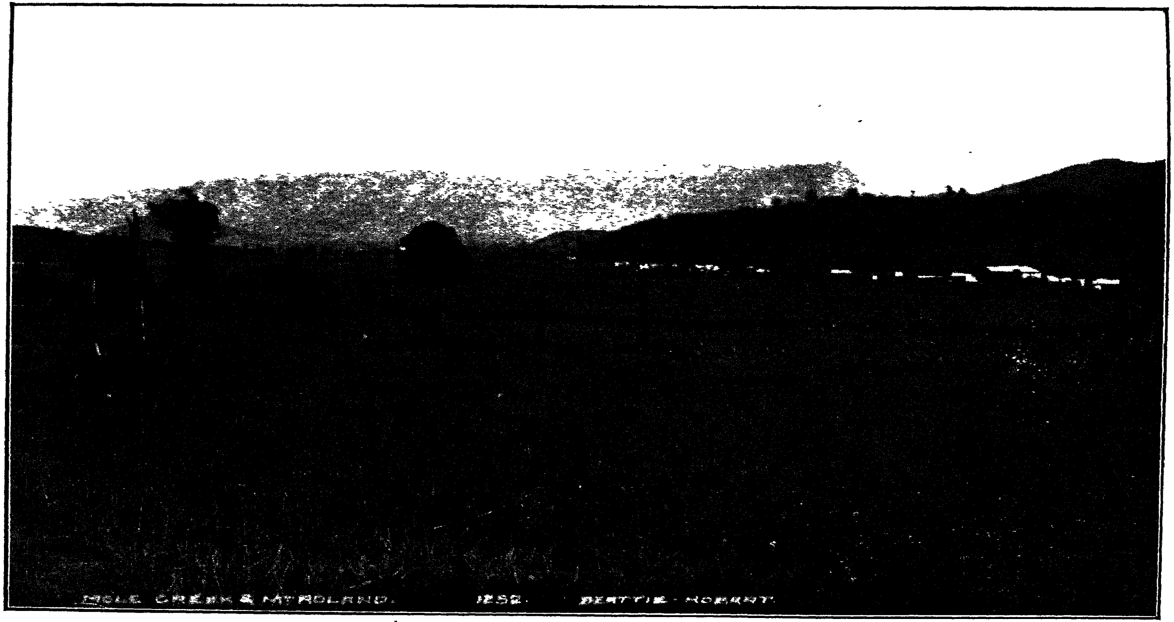


Mount Wellington and Lower Derwent Valley.

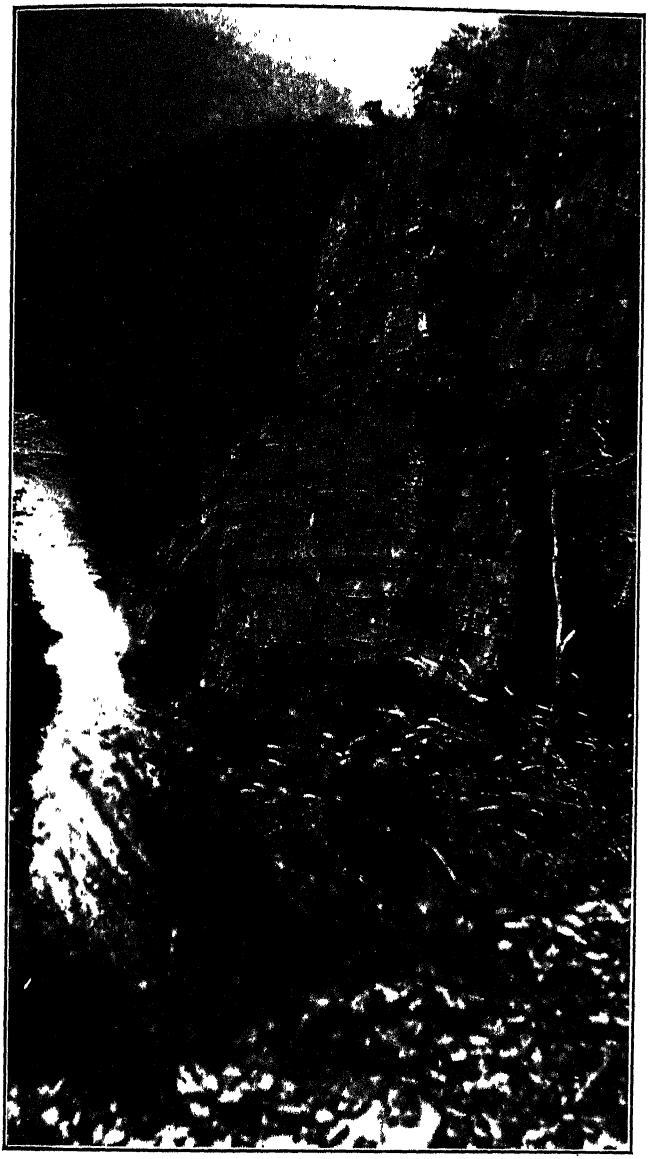
J. W. Beattie, photo.

Mount Wellington from Claremont.

J. W. Beattie, photo.



Central Mersey Plain. Mt. Roland (background). Mole Creek township (right centre).
J. W. Beattie, photo.



Mersey Canyon, Mole Creek.

A. N. Lewis, photo.

EXPLANATION OF PLATES.

Plate XV.

View from north of northern Arthur Lakes overlooking edge of Central Plateau and showing Brady's Look-Out (4,400 feet) in the background. This view gives a general idea of the general level surface of the plateau broken by occasional prominences.

Plate XVI.

This view shows the typical escarpmented wall of the Central Plateau and, in the foreground, the mature plain of the South Esk and its tributaries. Only the upper two-thirds of this escarpment are composed of dolerite and the lower one-third consists of the Upper Marine series of the Permo-Carboniferous sedimentary series. The Central portion of the upper edge of the plateau is shown, from the other side, to the right of Plate XV.

Plates XVII. and XVIII.

These views of Mt. Wellington illustrate the earlier remarks. Only the upper quarter of the mountain consists of dolerite, which forms a cap on the top of the sedimentary rocks below. Were the Derwent Valley to be considered as entirely waterworn, the main river would have cut a valley 150 miles long while its tributaries have had as little effect on this portion of the valley sides as is shown by these plates.

Plate XIX.

In the Mersey Valley at Mole Creek, Mt. Roland in the background. The Mersey flows at the foot of Mt. Roland in the centre of the picture and then behind the tree-covered hill behind the village.

Plate XX.

The canyon of the Mersey. This is taken only a mile or so lower down than the view shown in Plate V., and shows, it seems to the writer, as good an example of the effect of recent block-faulting movements as can be seen. This is, however, only typical of the gorges of many of the rivers descending from the Central Plateau.

NOTES ON THE DIARY OF THE REVEREND ROBERT KNOPWOOD, 1805-1808.

By

CLIVE LORD, F.L.S.

(Read 10th October, 1927.)

The diaries of the Reverend Robert Knopwood constitute a valuable section of the historical accounts of the early days of Tasmanian history. The events recorded by the first chaplain are largely of a personal nature, yet there are many entries which throw additional light upon the history of the years which followed the foundation of the settlement.

Robert Knopwood was born at Norfolk, England, on the 2nd June, 1761. He inherited considerable wealth, but squandered his fortune in his youth. He took Holy Orders, and was domestic chaplain to Earl Spencer for some years. In 1802 he was chaplain of the *Resolution*, and on the 14th January, 1803, was appointed Chaplain to Collins's expedition. Knopwood was also appointed magistrate at the Derwent settlement, and Collins looked upon him as one of his valued civil officers; but after Collins's death, Governor Macquarie was rather critical of Knopwood's unconventional methods. In 1823 Knopwood retired from Hobart to his property at Clarence Plains, and he died on the 18th September, 1838, at Rokeby, where his grave is still cared for.

A list of the Knopwood diaries is as follows:—

1801-1804	(This section has been published in Shillinghaw's Historical Records of Port Phillip.)
1805-1808	MS. in possession of Miss M. Hookey, Rokeby.
1808-1814	Missing.
1814-1820	MS. in the Mitchell Library, Sydney.
1821	Missing.
1822-1834	MS. in the Mitchell Library, Sydney.
1835	Missing.
1836-1838	MS. in the Mitchell Library, Sydney.

Miss Hookey kindly permitted the Society to take a copy of the MS. 1805-1808 for the Society's Library, and the present notes are extracts from the entries during this period, as well as some additional notes from the printed account of the earlier section, as, if these are included, the first four years of the Hobart settlement are included in the present review.

In addition to the general daily record, there are several notes at the beginning and end of the book. For instance, in front there are two mottoes:—

Dum Spiro Spero—Whilst I breathe I have hope.

Sic Fortis Hobartia Crevit—Thus by industry Hobart Town increased.

The latter, with the translation "Hobart" (in place of "Hobart Town") is the motto on the civic coat of arms of Hobart at the present time.

At the back of the volume there are numerous disjointed entries concerning various matters. Many of these relate to the hunting of kangaroo and emu, and the returns of the products of the chase which were delivered into the Government Stores. On the 19th April, 1807, Knopwood notes the receipt of £63 13s. 6d., being payment for 927lbs. of kangaroo. On the 24th August, 1805, there is an entry concerning one of his dogs which reads as follows:—"I have had Spot one "year this day, August 24, and he has killed 141 kang. and 24 "emews."

Although the entries refer largely to personal matters, yet these, in many cases, throw interesting sidelights on the early era of settlement, and Knopwood's references to the shipping and the weather are of distinct interest, and it is chiefly to direct attention to this interesting record relating to the initial settlement of Hobart that the present notes have been compiled.

GENERAL.

Ship *Ocean*, at anchor in Frederick Henry Bay, Van Diemens Land, Feb. 1804.

12. 2.1804 W.N.W. A.M. Fresh breezes and cloudy, with squalls at times. At 10 Capt. Merthew (1), Mr. Bowden, Mr. Collins (2), and self went on shore;

(1) Captain John Mertho of the ship *Ocean*. Knopwood was very careless as regards his spelling, etc.

(2) Mr. William Collins was later Harbour Master at the Derwent and the first "Bay Whaler."

we went armd. Capt. M. and self left them; we landed on the shore W.b.N., lagoon of salt W.N.W.; fresh lagoon N.W. by W. At the back of the high hill we see a great number of wild fowl and one emew, quails, bronswin, pigeons and parrotts. At 4 we returnd to the party we left, and got a great quantity of oysters. It appeared to me that the natives were much better supplied with fish and birds than those at Port Philip. The trees are very large and good, and a great deal of underwood. Near the fresh lagoon which was large—more than 12 or 14 miles round —was a great quantity of flax and very fine ————; besides ducks and teal were snipes, and I think a woodcock was flushd. At ½ past 6 we returnd in a very heavy gale of wind, with hard rain.

13. 2. 4 W.N.W. A.M.—strong breezes with heavy squalls of wind and rain. At 10 a party were sent on shore to get oysters, but the tide did not suit the lagoon. 17 of the natives were seen by the party; they reported the natives to be men well made, entirely naked; and some of them had war wepons; they had a small boy with them about 7 years old, and did not appear to flee from them. P.M. At 3 Capt. Merthew and Mr. Collins went on shore to get oysters.

14. 2. 4 W.N.W. A.M. Fresh breezes and hazy wr. Unable to sail, the wind against us. 4 p.m. Capt Merthew went on short a short time.

15. 2. 4 Calm N.W. A.M. First part light variable winds, inclining to a calm; at 4 sprang up a breeze from the N.W. weighed and made all sail. At 10 calm, light airs; ½ past light airs from the S.E. The centre of Betseys Island S.W. b S. At noon tkd ship to the eastward. P.M. ½ past 1 tkd ship. At 3 round Betseys Island, and bore up for the entrance of the harbour. At ½ past 3 saw a boat ahead which came alongside with Mr. Simonds, commander of H.M. brig *Lady Nelson*, and went with us up the River Derwent. At ½ past 6 anchored in Risdon Cove (3) in 4 fthms. Latter part light breezes and hazy.

(3) Risdon—named by Hayes (1793). Settlement founded by Bowen, 12th September, 1803.

Remarks, Risdon Cove, Van Diemens Land, Feb. 1804.

16. 2. 4 A.M. The morn very fine. At 10 the Lieut. Governor, self, and Lieut. Lord, of the Royal Marines, went on shore to see the settlemen formd by Lieut. Bowen, of the Royal Navy. As we left the ship Cap. Mertho, of the *Ocean* Transport, saluted Lieut. Coll. Coll., the new Govnr with 11 guns. When landed we were receivd by Lieut. More, the commandant of the New South Wales Corps, Mr. Montgarrett the surgeon and Mr. Wilson the storekeeper, the camp consisted of 16 privates, 1 sarjant, 1 drum and fife. After examining the camp, gardens, water, &c., it was the general opinion to be not calculated for a town. At 2 the Lieut. Gov. returnd on board. I dind with Mr. Mongarret at his house, on the N.E. side of the river. The watering place is by no means good. Capt. Bowen returnd to Port Jackson with an intention of going to England. (4)

17. 2. 4 A.M. At 10 the Lieut. Governor, Mr. Collins, and self went to examine a plain on the S.W. side of the river; the plain extensive, and a continuel run of water, which is very excellent; it comes from the lofty mountain (5), much resembling the Table Mountain at the Cape of Good Hope. The land is good and the trees very excellent. The plain is well calculated in every degree for a settlement. At 5 we returnd and dind with the Gov., much delighted with the excursion. The new settlement is 6 miles lower down the river than the present one, which is a great advantage, besides the landing of the stores so much better.

18. 2. 4 A.M. At 11 the Gov., Mr. Harris, Capt. Mertho, and self went and examined a part of the river to see a plain for the settlers, but the Gov. did not approve of it. The ground appeared to be much injured by the torrents of rain. The trees are very large and good. At 5 p.m. the Gov. went on shore to the settlement on the N.E. side of the

(4) Bowen left Risdon on the whaler *Ferret* on 9th January, 1804, and returned in the cutter *Integrity*. The vessel had just been built and was completed hurriedly. She left Sydney on 5th February.

(5) Mt. Wellington

river, and ordered the tents to be struck and sent on board the *Lady Nelson*. At 6 a little rain; they have not had a good shower of rain for 4 months.

19. 2. 4 Strong breezes and small rain. At 6 weighd anchor and dropd down the river towards Sullivan Bay, but the wind coming on to blow hard, came to anchor at 12. At 3 weighd & anchord in Sullivan Bay, near the small island (6). Capt. Mertho, Mr. Collins, and self went on shore, see some very fine trees.

Remarks, Sullivan Cove (7), River Derwent, Van Diemens Land, Feb. 1804.

20. 2. 4 A.M. Part the military this morn went on shore, and a part of the convicts, to pitch their tents. P.M. At 4 the Governor and some of the civil officers went on shore. He ordered my marquee to be pitched very near his (8), as it was at Port Philip. In the eve returnd on board. At 6 the military landed, and as many convicts as could be sent on shore.

21. 2. 4 A.M. at 10 I went on shore to see my marque pitched; returnd to dinner on board the *Ocean*. At 6 p.m. the Lt. Govnr went on shore having landed all his baggage, &c. At 7 I went and slept at my marque for the first time, and the Lt. Govnr honoured my name for parol, the first given on the new settlement, and Lieut. Lord's name for the Countersign. My marque is pitchd near the Gov., on the left of him. I slept at the camp for the first time and so did the Lt. Gov. Parole, Knopwood, C.S., Lord.

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(6) Hunter's Island—The site of this island is now covered by part of Jones and Co.'s premises.

(7) Lieutenant Governor Collins named the bay Sullivan Cove in honour of John Sullivan, Under-Secretary in the Colonial and War Department. He had also named the bay near the camp at Port Phillip Sullivan Bay. As regards the name Hobart, Knopwood refers to both the Port Phillip Settlement and the Risdon Settlement as "Hobert Camp." King, in his 2nd Commission to Bowen, referred to "the Settlement of Hobart "in the County of Buckinghamshire." The name Hobart Town appears in Collins's Order Book 5.5.1804, but on 24th April Collins had headed a despatch "Government House, Hobart Town."

(8) Governor Collins's marquee was pitched near where the portico of the Town Hall now is. Knopwood's tent was pitched opposite the present Museum, in Argyle Street.

22. 2. 4 Clear wr. and fine. At 8 went on board the *Ocean*, Capt. Mertho, to breakfast, having few things unpacked. At 9 returnd to the camp. At 11 Mr. More, Commandant of Risdon, waited upon Lieut. Gov. Collins, having some men deserted from his settlement. Employd getting my things in order. P.M. I dind on board the *Ocean*, and at 7 left the ship and came to camp. Mr. Wilson, the Commissary of Risdon Cove, calld upon me. C.S., Brown.

23. 2. 4 Very fine weather. At 10 Mr. Harris and self walkd to see the country. Mr. Mountgarret, the surgeon of Risdon Cove, calld upon me. P.M. The convicts employd in preparing a warf at the landing place on the island. Preparing a ser. for Sunday. C.S., Mountgarret.

24. 2. 4 Dr. wr. Many fires of the natives around, but none came near to the camp. I dind with Mr. Lord and Mr. Humphries. See two kangaroos in the eve, but did not shoot any. Preparing for the same. C.S., Averne.

25. 2. 4 Dr. wr. Preparing a ser. for Sund. Early this morn a bandycoot killd two of my fowls, of my white hens. Capt. Mertho calld on me. C.S., Innis.

26. 2. 4 A.M. at 10 the military paraded; ½ past all the convicts, settlers assembled, and the Lt. Gov. with the officers of the new colony, heard divine service. The sermon, by request of the Lt. Govnr., was upon the prosperity of the new settlement and to pray to God for a blessing upon the increase of it. Mr. Moore, the Commandant, and Mr. Wilson, the storekeeper from Risdon Cove, attended divine service. At 1 p.m. Lt. Lord, Mr. Humphrys, Mr. Collins, Mr. Simmons, of H.M. brig *Lady Nelson*, and self went in the Gov. black cutter to Risdon Cove, where I did duty to all the convicts, &c., &c. I dind with Mr. Montgarret, and returnd in the eve. C.S., Winter.

28. 2. 4 A.M. we had rain all night. Caught a spotted cat which had killd my fowls, and the Governor's gamekeeper brought me a large kangaroo, the first, killd in this colony. [By Collins's expedition.] C.S., Varlo.

5. 3. 4 A.M. at 9 I went on board the *Ocean* with Mr. Humphrys. 10, Capt. Merthow, Mr. Brown (the botanist), and we went to Risdon Cove, where we dind with Mr. Mountgarret. At 4 we all went up the Derwent River, where we slept on the west side of it, about 17 miles from the camp. I killd two black swans. C.S., Herdsmans Cove; Parole, Excursion.

6. 3. 4. A.M. at 5 we all got in our boats and went 5 miles up the river and breakfasted; on the east side of the river got some more swans. At 10 we got into the boats again and went 10 miles further up, where dind and pitchd our boat sails for a tent. At 4 Mr. Mountgarret and Mr. Humphrys left us for Risdon Creek. Capt. Merthow and self went ashooting; killd a pigeon. At 6 a.m. Brig *Lady Nelson* saild for Pt. Jackson with a fair wind. C.S., Pillar.

7. 3. 4 At 6 we breakfasted. ½ past 7 Capt. Merthow and self went ashooting 15 miles up the river. Mr. Brown went up the mountains abotanising. The river took these directions where the falls of water were:—1, fall reach, E. to W.; 2d., from S.E. to N.W.; 3rd reach, S.-W.; 4th, W.S.W.; 5th reach, N. b W. We walkd on the west side of the river, the hills, &c., very high. When one side of the river was hilly, the other a vally, and it continued so for more than 40 miles from the camp, where there was an extensive plain of very few trees. We see kangaroos, emews, pigeons, and parrotts. At ½ past 4 we return to the hut we left in the morn. During our walk we see a great many of the native hutts and the fires they made. No doubt they see us. In the eve the natives made a fire near where we slep, on the west side of the river. C.S., Hogan.

8. 3. 4 A.M. at 5 rain, with hard squalls. We struck our canvas and saild for Herdsman's Cove, where we reachd about 10 and breakfasted, the land appeard not very good. At 12 as we were coming from thence a native appeard, but the distance was too great to discover much of him. Strong

breezes and squally. At 5 we arrivd at the *Ocean*, where we dind and went to the camp at ½ past 6. C.S., Palmer.

5. 4. 4 A.M. Governor Bowen and self after breakfast went up of Mount Direction on the North-East side, and came down the South-West, and had a very long walk. The view was grand. At 2 p.m. the boat returnd from the 1st fall of the river with Mr. Mountgarrett, Mr. Brown (9) the botanist; and Mr. Humphrey the mineralogist. They went in search of the head of the river, but could not find it.

11. 4. 4 A.M. Mr. Humphry breakfasted with me,—and we walkd to the Table Mountain, where I killd a *white hork* (10), the first that has been seen in this country. A very great curiosity. We returnd home at 5 p.m. Mr. Wilson smoked a pipe with me, Mr. Milne went to Risdon to have his examination taken before Mr. Bowen and Mr. Mountgarret.

27. 4. 4 A.M. at 11 the Lt. Govnr and self went and markd out a burial ground (11) at a distance from the camp. Receivd a letter from Capt. Bowen to visit Risdon Cove, but could not, in the eve took a walk.

28. 4. 4 A.M. at 10 Mr. Mount Garret came to the camp; at ½ past 2 p.m. I buried Mr. Edwardes child. The Lt. Governor and all the officers attended at 3. I went to Risdon Cove with Mr. Mountgarret, Mr. Bowden, Mr. Harris, and dind there. This day twelve month we took our departure from England. Capt. Bowen and Mr. Wilson went with the mutiners prisoners to land them on an island 8 of them, and all Irishmen.

16. 5. 4 . . . Mr. Brown and Mr. Humphry came to the camp, they had been out 16 days, and got to the River Huon by land.

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(9) Robert Brown, the celebrated botanist, had arrived at Port Jackson in the *Investigator*. Brown stayed some time in Australia, and upon return to England published his classic work *Prodromus Florae Novae Hollandiae et Insulae Van Diemen.*

(10) "*A white hork*"—a typical example of Knopwood's spelling. The hawk would be a white goshawk (*Astur novae-hollandiae*). This species was first described by Gmelin in 1788. It occurs also in S. & E. Australia.

(11) A burial ground. The old St. David's cemetery, now St. David's Park.

25. 5. 4 At 8 Capt. Bown went to Risdon, and I went and chose a place for my garden.

28. 5. 4 At 10 Mr. Humphrys and self went up the mountain on the S.E. to look for the *Ocean*, but could not see it.

3. 6. 4 At 11 the wr. was so bad that divine service could not be performd. At 12 all the officers, civil and military, and settlers met at my marquee to consult on the price of labour, &c., &c., and deliverd the report to the Lt. Govnr. In the eve Mr. Harris smokd a pipe with me.

4. 6. 4 A.M. this day being H.M. birthday was not observd as a holiday by reason of the *Ocean* not being arrivd from Port Philip with the remainder of the civil and military officers, marines, and convicts, but will be kept on her arrival at this Colony. Mr. Harris, Mr. Bowden, and self dind with Mr. Lord and Humphrys.

5. 6. 4 At 7 a.m. His Honour the Lt. Governor, with Mr. Harris, the Surveyor-General, and Mr. Collins, the Harbour Master, went in the Lt. Gov. cutter to Betsey's Island to survey it; and they returnd to camp at ½ past 10 p.m. The aft. and night blew very hard from the S.W. that they were obligd to land at Sandy Bay, 5 or 6 miles from the camp and walk in.

6. 6. 4 Mr. Harris and self had our new gardens measured out.

19. 6. 4 Mr. Lord breakfasted with me, and at 11 I walkd to look for the *Ocean*, but could not see her. I dind with Mr. Lord at his new house (12). Mr. Humphrey returnd in the eve from the mountain.

26. 6. 4 At ½ past 10 the Marines landed from the *Ocean* and the prisoners landed their things. At 1 p.m. my man Salmon killd a kangarro length from the end of the tail to the nose seven feet two inches, length of its tail 3ft. 4in. and a half, the weight of the kangarro was 150lbs.

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(12) The first house built in Hobart. A "wattle and daub" structure known as "the house in the bush." The position was near the present corner of Macquarie and Harrington Streets.

27. 6. 4 At 10 Mr. Wilson from Risdon came to the camp. At 3 p.m. all the prisoners landed and encampd at Hobart Town. Lt. Johnson and Mr. Wilson dind and stayd all night at my marque.

30. 7. 4 At 7 Mr. Wilson (13) went to Risdon. At 8 Lt. Johnson went up with orders for everyone to embark on the *Ocean.* At 4 p.m. Mr. George Collins, son of the Lt. Governor's and Mr. Wright Todd dind with me. ½ past 8 p.m. Lt. Johnson calld on me; he informd that everyone was embark on board but Capt. Bowen, who slept at the farm, at the house which he built for Martha Hays. The wind blowing very fresh and a great quantity of snow upon the mountains.

15. 8. 4 At 8 the Lt. Govnr sent two men to begin my house, and this morn Gun and Foreshaw began mending my boat, and Eodem literd which was sent to the Lt. Gov. was withdrawn after a meeting of all the officers, Capt. Rhodes, of the *Alexander* whaler, came on shore and took an early dinner. At 5 p.m. I went on the Parade, where the Gov. and Lt. Johnson was walking. The Gov. was very pleasant, and on our coming away to my markwequee said that all was amicably settled.

20. 8. 4 At 9 the masons began to lay the foundation of my house, and the Carpenters at work, the *Lady Barlow* making preparations for sailing.

1. 9. 4 A.M. at 10 took a walk, saw no kangarro. At 3 p.m. rain. At 5 I dind with Lt. Johnson, and as we were sitting down to dinner a large kangarro came very near his marque, and through the camp. ½ past 9 the centinel fird at a man near the magazeene, and he escaped.

3. 9. 4 A.M. A very fine morning. At ½ past 11 Lt. Gov. Collins and self walkd to the farm and there took his boat and went to Risdon Cove; the Govnr ordered all the houses that were there to be pulled down. At 4 p.m. we arrived in the camp, and I dind with him.

(13) The storekeeper at Risdon. Probably T. Wilson, at one time Captain's Clerk on H.M.S. *Glatton.*

20. 9. 4 At 9 I went to the farm in my boat to meet my man who was out at Mr. Millers the settler, to kill a kangarro; at 11 he came there; had bad luck, killd only one. I met Mr. Johnson at the farm, and we went and calld upon Martha Hays. Lt. Johnson rode to Hobart Town, Capt. Bowen's mare. At 4 p.m. dind with Mr. Bowden and met there Lt. Johnson and Mr. Fosbrook.

25. 9. 4 At 11 Mr. Harris and self marked out a place of 2 acres for a garden.

30. 9. 4 The morning so very windy that divine service could not be performd. This morn two men began to cut down and burn off 2 acres of ground for me at my new garden. At 7 the wr. began to be very windy, and at 10 a heavy gale came on, which increased till near 12.

5.10. 4 At 12 all the civil and military officers met at Mr. Bowden's to consult about a plan of building a subscription room, when we all wrote to the Lt. Governor to prove the plan to him. At 1 the Lt. Gov. and Mrs. Powers went to the farm in his boat.

16.10. 4 A.M. early this morn the Governor's boat went for his keeper and Hacking up beyond Risdon; they had no success, and the boat took them to Risdon. Lt. Johnson and Mr. Harris dind with me. This day twelve months we landed from His Majesty's Ship *Calcutta* at Port Philip, New South Wales, and all the military and convicts were encampd there.

13.11. 4 A.M. Preparing my letters to England for the *Alexander* whaler. Settled with Capt. Rhodes. The Governor supplied Mr. Harris and self with 14 days' provisions and a boat. Letter for Esq. Mr. and Mrs. P., Miss Kd., Wm. Tustin Esq.

14.11. 4 A.M. fresh breezes from the S.W. All hands employd as needful. Middel part more moderate; at daylight clear. At 5 a.m. took the breeze from the N.W.; took the anchor and bore for Storm Bay Passage. At 6 a.m. went on board;

Revd. R. Kd.; G. P. Harris, and James Groves with a Govt. boat manned with the following men:—Henry Hakin (14), the Gov. coxwain, Powell, Garrett, Richardson, Davis, Atkinson, Scholar, Wm. Russell, Henry Miller, and Salmon. At 12 brought up in Storm Bay Passage in 26 fathoms water with the peak of the Table Mountain which we gave the name of Mount Collins (15) in honor of the Lt. Govnr.; the mount bearing N.W., Point Louis N., by east 4 miles, the east point of Ile Bruny S.W. by S. dist. 4 miles. At 3 p.m. sent 3 boats for black swans, and Mr. Harris, Capt. Rhodes, and Groves and self on shore. It was the North Cove where the ship layd. The soil very bad, all stones, and the tree not good. At sun set we returnd and the 3 whale boats. They took 79 swans. This aft. when we layd at anchor we see 2 of the natives on Isle de Bruny.

15.11. 4 A.M. fresh gales. At 2 the anchor came home squally, brought up in 12 fathoms in a hard, muddy bottom. At 12 sent a boat to Hobart Town with letters, and for some sheet lead. Mt. Collins bore N.N.W., and Point Luis N.N.E., dist. 3 miles. The Isle Bruny N.E. b E., dist. 1 mile, the point from the westermost shore, that from the N.W. branch W. by North, dist. 2 miles.

16.11. 4 A.M. this morn we went to the opposite shore, where, after tracing the coast 6 miles we arrived at a fine cove, which abounds with oysters. On the north side, a little above low water mark, we found a large conger eel, which the Revd. R. Knopwood shot. It weighd 20lb. We gave the name of the Cove, Conger Cove. In this cove we markd a tree—R. Knopd., R. Rhodes, Nov. 17th, 1804. From the ship the tree is 4 miles S.W. b S. It stands from the rocks on the side of the hill. The boat up at Hobart Town.

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(14) Henry Hacking had been pilot at Port Jackson. He had been twice sentenced to death.

(15) Now Mt. Wellington, so named by Governor Macquarie.

On Board the *Alexander*, whaler, Cap. Rhodes, Storm Bay Passage, November, 1804.

17.11. 4 A.M. this morn we went on shore on Isle Bruny and see many grass trees. The day was very wet. We killd a kangarro. The men took some black swans.

18.11. 4 A.M. at 8 observd a boat come round Point Louis. At 10 she came on board. Struck top gallant yards at meridian hard gales and squally. We continued on board with the boat belonging to Government. At 6 p.m. let go the other bower anchor. Hard gales. The wr. was so bad that we could not stir out.

19.11. 4 A.M. at daylight more moderate. Hove in the small bower and secured it. At 8 sent 2 boats after black swans. At 10 they returnd with 21. This morn Capt. Rhodes, Mr. Groves, and self, went on Isle Bruny and killd a kangarro. After travelling in the country several miles we returnd to a point where we orderd the boats to. Here we markd 3 trees laying in the N.E. and S.W. direction. At the back of them Revd. R. K. put several sorts of seeds in the ground. The trees were markd as follows:—The Revd. Robt. Knopwood, November 19, 1804. On the back D.G., for Daniel Groves, son of Mr. Groves, and to the S.W. 6 paces, R. Rhodes, Commander of the *Alexander* whaler, to the tree 24 paces S.W., G. P. Harris, Surveyor, Hobart Town (16), and on the back, J. Groves. This point I gave the name of Alexander Point, in honour of our friend Capt. Rhodes. The peaks of the Table Mountain bore N.N.W.; and Conger Cove, W. ¼ S., dist. 3 miles.

20.11. 4 A.M. at 8 took up the anchor and got under weigh. At ½ past 1 brought up in 8 fthms, about a mile distant from Green Island, and got a dozen black swans eggs and some young birds.

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(16) G. P. Harris was a very careless individual. His surveys gave rise to many disputes, and the work had to be done again by Meehan and Evans.

21.11. 4 A.M. at 4 took the anchor up and ran down the passage as far as the mouth of the River Huon. At 9 brought up in 8 fthms. At 10 4 boats left the ship. At 3 we returnd, having been up the river Huon, where I see a beautiful island which I gave the name of Gardners (17), in honor of my friend, the Honble A. H. Gardner, Capt. of H.M. ship *Hero.* We caught some crayfish and got some shells. At 4 the three boats returnd with 78 fine black swans. The *Alexander* layd at anchor near a small rock, much like Noahs Ark Rock at Simons Bay, Cape of Good Hope.

22.11. 4 A.M. at 8 the Government boat left the ship. ½ past Mr. Harris and Groves in one boat, Capt. Rhodes and self in another boat, went up the River Huon. Opposite the Huon Island is a sunken rock, in the mouth of the river, which runs ½ a mile long from east to west. We went up the river as far as the flats, where we pitched our tents, made ready for dinner some black swans, which we caught in abundance.

In the River Huon, 1804. In the Storm Bay Streights, 1804.

23.11. 4 A.M. at daylight we got up and breakfasted. Sent the whale boat after swanns, and we went in the Government cutter up the Huon to the 1st fall. The river is by no means so fine as the Derwent, and as for the land there is none not even fit for a garden. At the first fall there is a small island in the middle of the stream. At ½ past 1 we returnd, and arrivd at the Camp Point, where we left in the morn, where we dind and slept.

24.11. 4 A.M. at daylight we got up and at 3 a.m. made sail. At 8 or ½ after, we all got on board the *Alexander*, where she was laying near the Isle of Huon, in the Straights.

25.11. 4 A.M. at 10 a breeze sprang up. Mr. Harris, Groves, and self went in the Government boat, and on our leaving the ship we gave them three cheers. Capt. Rhodes hoisted his pendant, and we were cheerd by all the crew. We went into a bay calld La Petit Anse (18) on the N.E. It

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(17) Now Garden Island.

(18) Now Little Taylor's Bay.

being Sunday, and having come some way, I gave orders for the tents to be pitchd, roasted some black swans, and there we slept. We observd many of the native fires. At 11 a.m. Capt. Rhodes saild back into the Straights.

In Storm Bay Streights, 1804.

26.11. 4 Very early this morn we breakfasted, and at 6, with a party of our men, with Mr. Harris and Groves, went up a mountain steering a N.E. b E. course, and with very great difficulty we got up to the top of the mountain. We were three hour and a half going about a mile and a half. Upon the top we see a very fine cedar and sassafras. At 12 we returnd, got everything ready for sailing. At ½ past 1 saild and went into a bay near . . . . We slept on the west side of Storm Bay Passage.

27.11. 4 At 6 we breakfasted and prepared to sail to Hobart Town. 13 minutes past 7 made sail, wind south, Green Island E.N.E. At 12 we observed the *Alexander*, Capt Rhodes, under sail, beating out of the Streights . . . . At ½ past 1 we got on board. The wind came quite calm. At 6 we observed a schooner coming up the river. I sent the pilot, Henry Hakin, on board to take care of her. The wind————. We all slept on board.

28.11. 4 A.M. at 7 Mr. Harris and Groves went in the Government boat to Hobert Town after breakfast. Capt. Rhodes and self went in his boat. At ½ past 10 we arrivd. I waited on the Governor. At 11 the *George* schooner, Capt. Stewart, anchord in the Bay. I dind with the Govnr. Capt. Rhodes slept in my marque. We were all much delighted with the excursion, and indebted to Capt. Rhodes for his attention to us. I brought the Houen pine home with me, the first seen.

29.11. 4 A.M. Capt. Rhodes breakfasted and dind with me and Mr. Johnson. Found that the ground at my garden would not do. The well was very bad; salt water.

3.12. 4 . . . The Governor gave me leave to exchange the ground for a garden.

13.12. 4 I went to my new garden and had it markd out (19).

21.12. 4 A.M. at 9 the Governor and self went to the place where I fixd upon for a house. He gave orders that the groun work should be began on Monday at ½ past 11. My two men returnd from Risdon and brought home with them 4 kangarros. Mr. Harris dind with me. The day so hot I could not dine in my marque. I dind at Mr. Harris house. Mr. Janson came in the eve.

2. 1. 5 A.M. this morn two men, Forshaw and Munden, began to put my cottage up at my garden.

3. 1. 5 At 4 a.m. the house of Joseph Michael, Jew, caught fire and was consumed.

30. 1. 5 The masons tiled in my pigeon house, the first tiled house in the Colony.

22. 2. 5 A.M. at 10 I struck my marquee and had it pitched near the cottage.

25. 2. 5 A.M. at 10 I married Mich. Mansfield and Sophia Childers in my cottage.

25. 4. 5 This day two years we saild from Spithead, the *Ocean* transport in company with us.

26. 4. 5 General Orders, Government House, Hobart Town, 26th April, 1805. The commissary will on Tuesday next issue until further orders the following rations weekly:—

3½lbs. beef.
6 ,, flour.
6 ,, wheat.
6oz. sugar.

27. 4. 5 A.M. at 11 Mr. Groves and self went up the river and caught some very fine rock codd. My man returned with my dogs and brought a very fine emew and kangaroo.

4. 5. 5 At 11 discovered a very daring robbery which John Earl, my gardener, had committed upon me by breaking into my closet. I found brandy and some pick lock keys upon him.

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(19) This would refer to Knopwood's property later known as "Cottage Green"; before the cottage was built Knopwood's camp was situated in a position now occupied by the western side of Argyle Street, opposite the present Museum.

7. 5. 5 This morn my man that robbd me receivd part of his punishment of 500 lashes.

18. 5. 5 At 12 I went afishing and caught 38 rock codd, some very large, and 5 perch and some flatheads, in all about 60 fish, and returnd home at 5 p.m. to dinner.

21. 5. 5 A.M. at 10 the weather remarkably fine. Vanstretton employd erecting my cottage chimney and oven and stove. At 11 I went out afishing and caught a very large crayfish, the first that was taken in this colony, and I gave to His Honour.

29. 5. 5 2 p.m. I went out afishing and caught some very fine perch, rock codd, and a crayfish.

31. 5. 5 At 12 I went out in my boat afishing and caught a crayfish weighing 6lbs. Came home to dinner.

2. 6. 5 At 4 p.m. my man returnd from Risdon and brought home three large kangaroos, one of 120, one 80, and one 70. In the eve I went and suppd at Mr. Groves. I carried them a crayfish which I caught weighing 7lbs. This day aged 43 years.

4. 6. 5 A.M. it being H.M. birthday it was a holiday throughout the Colony. At ½ past 11 the Military paraded and at 2 a royal salute 21 guns was fird. At 2 p.m. His Honor the Lt. Govnr gave all the prisoners ½ a pint of spirits. 5 p.m. His Honor gave a dinner to all officers, civil and military, and the eve concluded with a large fire and other demonstrations of joy. Capt. S. has a government stave which he used to harrow his ground.

8. 6. 5 I went across the river and caught four very fine crayfish.

12. 6. 5 At 10 Mr. Grove and self went in my boat on board the *Richard and Mary* to buy some sheep, but found that they were too dear.

18. 6. 5 A.M. engaged all the morn upon business examining the 5 prisoners that went into the bush. They informd me that on the 2nd May when they were in the wood they see a large Tyger that the dog they had with them went nearly up to and when the tyger see the men which were about 100 yards from it it went away. I make no doubt but here are many wild animals which we have not yet seen.

19. 6. 5 This morn my man came back from Kangaroo hunting and had very great success. Killd 3 large kangaroos and 2 very fine emews. My little sow had young piggs. At 4 p.m. the *Governor Hunter*, schooner, from King Island, anchord in the bay.

27. 7. 5 The Lt. Govnr took kangaroo into the store at 1s. per lb.

6. 8. 5 This day we were put on shorter allowance. 2lb. 10oz. Pork, 2lbs. flower, 2lbs. wheat, 2lbs. meat, and not a drop of spirits in the colony.

12. 8. 5 In honour of his Royal Highness the Prince of Wales' birth the colours were hoisted on Hunters' Island.

16. 8. 5 The colours were hoisted this morning in honour of the Duke of York's birth.

2. 9. 5 I went out ashooting and killd some quails.

3. 9. 5 Walked with the dogs towards Sandy Bay and killd a very large Forest. kangaroo.

10. 9. 5 I walked with Mr. Gains to a river called Mr. Brown's down towards Storm Bay Passage, distant from Hobart 10 or 12 miles across the country, where it was very bad walking.

15. 9. 5 My man returnd from hunting and brought home a white kangaroo.

19. 9. 5 I heard that the spirits which some of the officers bought of Capt. Bristow at 25s. per gallon was very bad rum from the Leeward Islands.

3.10. 5 This morn I gave the Governor the skin of a very beautiful white kangaroo, a very great rarity, the first that has been seen in the Colony.

5.10. 5

August	3	..	70	..	3	10
	8	..	296	..	14	6
	16	..	342	..	17	2
	23	..	268	..	13	8
	27 29	..	42	..	2	2
Sep.	9	..	316	..	15	6
	16	..	224	..	11	4
	24	..	350	..	17	10
	27	..	85	..	4	5
Oct.	5	..	160	..	8	0
					£107	13

The number of kangaroos killd by my dogs in two months and 2 days were 66, and the quantity given away and used in the hous did not amount to less than £160. This day I send one to the stores, after being skind and well cleand, weighd 105lbs. My dogs have killed the largest and have had only two men out with them when others of the officers have had three and four men out at a time with theirs, besides a government boat at command, which I have not once had.

15.10. 5 My man returnd from the Coal river. Gains brought home some Coal from the river, and very good.

16.10. 5 A.M. at 8 *The Sophia*, Mr. W. Collins, made the signal for sailing. 11, George Collins, the Lt. Govnr son, calld upon me to take his leave. 1 p.m., I see Mary Collins, the Lt. Gov. daughter, and wishd her health, &c. 5 p.m., the Lt. Gov. went on board the *Sophia* with his son and daughter and left them there.

6.11. 5 A party of settlers from Norfolk Island came to see my land which they all like very much, and said it was the only place worth seeing.

2. 1. 6 A.M. at ½ past 4 I waited upon His Honor the Lt. Govnr at ¾ past we with Mr. Bowden the 1st assistant Surgeon and Mr. Harris the surveyor walkd to the Govmt. Farm where we breakfasted at 7. We got into the Govnr 6 oar boat and went up the river to the first fall where we arrivd at half past 5, a distance about 40 miles from Hobart Town. There we had two huts built at ½ past 6 we sat down to a very excellent dinner, everything provided by the Governor but the kangaroo. My man met us with a very fine one killd in the morn, the same eve my man went out and killd a very fine kangaroo which I supplied all the servants and men with.

The Govnr and self slept in one hut, and Mr. Harris and Mr. Bowden in another. C.S., "Collins."

3. 1. 6 A.M. at 5 we breakfasted, and we all set off up the river on foot about 15 miles observing the course of the river and the hills and plains, which were very extensive. The river at the distance we went was very broad and a strong current, we went to the first Cataract there we refreshed and returned at 6 p.m. to dinner the men that were left behind caught some very fine eels which we had for dinner and a very pleasant eve we had. C.S., "Success."

4. 1. 6 A.M. at 5 we breakfasted, and at ½ before seven we got into the boats and went to Herdsmans Cove, the Govnr and we walkd to see the plains which were very extensive. at 2 p.m. we dind and got into the boat and came to Hobart Town, where we arrived at 8, after one of the pleasantest excursions that I ever took. I never see the Governor so comfortable and paid every attention to us that was possible. C.S., Return.

17. 3. 6 A.M. at 10 the weather very cloudy. Went out afishing, caught very few. At 7 p.m. the boats crew drew their seine opposite my house and enclosed so many mackerell that with difficulty they could draw the net on shore. C.S., St. Patrick.

14. 5. 6 A.M. at 12 Capt. Sladden and the Judge Advocate calld upon me at 1 p.m. I waited upon the Lt. Govnr. We were informd of Lord Nelson's Victory and the Cape being taken I received letters and Box. C.S., Bate.

17. 5. 6 A.M. the day very fine at 11 I took a walk to Sandy Bay and killd some wattle birds at 4 p.m. Mr. Hambleton of the *King George*, whaler, dind with me. C.S., "Wales."

30. 5. 6 A.M. the magistrates met by order of a General Order to examine into the state of the Colony and to adjust the best manner for the safety of the Colony and to regulate the high price of provisions and examine the bakers, &c., &c. C.S., "Monmouth."

25. 7. 6 A.M. at 3 some persons unknown set fire to the hospital with an intention to burn Boothman in it, but fortunately he was awake when it first broke out. They set it on fire three places,

everything was burnt in the hospital, 12 pairs of sheets, besides blankets and beds. the Lt. Govnr. gave a general reward this day of 100 Pounds and a free pardon and passage to England if anyone would discover the insenderies. At 5 p.m. I dind with Capt. Johnson and met Capt. Sladden and Lt. Lord. C.S., "Discover."

6. 8. 6 A.M. the weather very wet. By Lt. Symonds we had the information that the *Venus*, brig, commanded by Mr. Chase, was taken by the prisoners at Pt. Dalrymple and ran away with the property to a very large amount, both for Port Dalrymple and this Colony. for me there were 30gls. of spirits and a barrel of Porter. C.S., Chase.

22. 8. 6 A.M. at 8 the colours were hoisted on Hunters Island, the Lt. Govnr having appointed this day to be observd as a day of Thanksgiving for the late glorious success which attended His Majesty's arms over the combined fleet of the enemy off Cape Trafalgar on the 21st day of October last. Divine Service was performd and attended by every officer, Civil and Military, settlers, free people, and the prisoners. Every person attended that was not prevented by sickness. At 12 a Royal Salute was fird from the Ordinance on the Parade and Capt. Hatcrow fird a royal salute from the *Carlton*, Letter of Marque, the day was very fine but cold. C.S., Victory.

25. 8. 6 A.M. the day very fine sowd an acre of wheat and had it chippd in. Capt. Sladen's [20] sale was this morn, and one pound of Tea was sold at the enormous price of six guineas a pound and bought by Lieut. Lord, the day very fine. C.S., Newark.

27. 9. 6 A.M. engaged this morn upon the bench from 9 to ½ past 12 by myself. The prisoners very greatly distressed for provisions, not any flour, meal, or maize in store. This day things sold at the following price:—Biscuit 4s. per lb., meal 3/6 do., Maize 3/3 do., Tobacco not fit to be made use of 2/6 per inch. The colony very greatly distressed for everything, and everybody

(20) Captain Sladen returned to England in the *Carlton*, which left on 4th September.

crying out for the want of bread, sugar 5/- per lb. Rice 2/6 and kangarro at 1/- per lb. C.S., Cowes.

1.10. 6 The morning fine after the gale. At 1 p.m. I went up the River with my men as far as the farm that Scutter might detect my man Earl in using some of my seasond wood &c. for bedsteads and table. At 3 I returnd when Scutter informd me that he had taken Earl with him and he was putting the bedstead together. In the eve I waited on the Govnr and requested him not to punish Earl but beggd of him to give him a reprimand the table was for Beker and the bedstead though he would not acknowledge it. C.S., Croydon.

2.10. 6 A.M. this morn at 10 the Govnr Reheard Earl with a reprimand. At 1 p.m. I went out afishing and took Earl with me. In two hours opposite my house we caught in the bay 5 dozen of rock codd and 1 dozen flatheads. The weather was rainy and blowing a gale from the W.N.W. C.S., Dalkeith.

3.10. 6 A.M. this morn went out afishing had very bad success blowing hard from W.

4.10. 6 A.M. at 6 this morn I went out afishing caught very few for breakfast. The distress of the town very great for want of provisions scarce any provision for the marines and prisoners. At 11 lent my new boat to some marines to get some fish having nothing else to eat. Potatoes 2s. a lb. and Flour sold by Mr. Bate the D.J. Advocate at 6s. per lb. Mr. Collins this morn went upon Mount Direction to look for a ship, the day very cold blowing hard from S. West. Caught very few fish amidst all this scarcity of bread &c. at this season we have scarce any vegetables, the potatoes are all in the ground. C.S., Dartford.

5.10. 6 A.M. the morn very cold blowing hard. My man and a party of Marines went out afishing had very bad success. At 12 calld upon His Honor the Lt. Governor he complained very much for the loss of kangaroo none being in the store and it is generally believed that the prisoners which are in the bush had taken many of the

gentlemen's dogs. The wind blowing very hard this morn a party of 5 went into the bush. Blowing hard from the west. C.S., Deal.

6.10. 6 A.M. the wind continued all night. At 1 p.m. blowing a very heavy gale from the West at 3 M. Mansfield came down to the Governor who informd him that there was a ship arrivd in Frederick Henry Bay and that an officer of the R.Ms. one Henry Hakin was at his house. The Lt. Govnr sent a boat up for him the same eve they landed, the ship was the *King George* Whaler from Sydney. C.S., Dover.

7.10. 6 A.M. at 10 Henry Hakin the Pilot calld upon me and informd me that the distress at Sydney was greater than here there were no grain or flower of any kind and that some people had died through want. At 1 p.m. I waited upon the Govnr who read me a letter from Govnr Blyth the new Govnr and likewise of the new Ministry in England. Mr. Fox Secretary for the Foreign Department and Lt. Spencer for the Home &c &c. &c. At 2 Capt. Johnson and Lt. Henderson the officer which came from England calld upon me. Lt. H. came to relieve Capt. Sladden and Lt. Breedon who was on board the *King George* to relieve Capt. Johnson who is recalld by the Admiralty. I had a letter from the Revd. Mr. Marsden, a very great change of affairs in England. C.S., "Henderson," the new officer of marines.

8.10. 6 A.M. at 9 I took my 3 men with Guns and sent to kill kangaroo we had very bad success the ship did not arrive. Came home at 5 p.m. C.S., Deptford.

13.10. 6 A.M. at 5 went out afishing. At 11 engaged upon business Xnd. Mrs. Sargents child and took lunch at Mr. Bowdens. Waited upon the Govnr the day very fine. It is truly lamentable to see the distress that the people are in not a man able to do any work, what few there are employd in unloading the *King George*, the Lt. Govnr is obligd to give them pork and beef 4lb. a man, all our Poultry are dying having nothing to

give them. The poor piggs &c. &c. are all dying and at this season we should have young ducks and chickings. My poor pigeons are all most dead for want of provisions only 4 remaining out of 16. C.S., Dudley.

21.10. 6 A.M. the men came and drew the seine opposite my house and caught a great many fish. At 8 blowing very fresh from the North. Engaged upon business, this day twelve months the ever memorable battle of Trafalgar was fought. At ½ past 9 a signal was made that a strange sail was in the river. In the eve lightning. C.S., Egham.

28.10. 6 A.M. the distress of the Colony beyond conception meat 3/6 per lb. Coarse meal 9s. and potatoes 1/6 a lb. Indian corn 7/- a lb. and very bad and a very little to be obtained. No work to be done, the poor people go out afishing. C.S., Furnham.

29.10. 6 A.M. at 6 I went in my boat down to Brown's River afishing and took my gun killd 4 ducks returnd at 6 p.m. to dinner. My Pigeons dying for want of provisions and poultry. Finish every grain of corn &c. for my pigeons. C.S., Flint.

1.11. 6 A.M. at 11 I waited upon the Govnr. 12 went to Captain Johnson when we took a walk. at 6 p.m. the Govnr punishd 6 men from the ship *Ferret* with 200 lashes each because they refusd to let 2 casks of biscuit and 3 of flower land for the relief of the colony. In the eve I calld upon Mr. Groves. C.S., Duckworth.

4.11. 6 A.M. at 11 waited upon the Lt. Govnr. Afterwards took a walk with my gun. Mr. Bate calld upon me upon business. At 3 p.m. a little rain. 4 Connolly brought me a little black cat. This day we had 2lbs. of biscuit and 1lb. of flower a week each man a very great relief to the Colony. C.S., Greenwich.

29.11. 6 A.M. at 8 got into the boat went across the river sent 2 men out akangarooing self and Earl took guns and went after some ducks at a lagoon. I see three snipes and had the good luck to kill 2.

On my return home I gave them to the Governor who wrote me the following note:—

"Dear Sir,

I feel much obliged for your handsome present of what I did not know we had in this Country and which I with pleasure accept as a very great treat. Yours truly, DAVID COLLINS. 29th Nov. 1806. Revd. R. Knopwood.

The first snipes killd in this Country. Earl killed a couple of Teal. C.S., Hockliffe.

18.12. 6 A.M. at 9 Mr. Williams the settler calld and I paid him 10£ the reward I offerd for any one that would bring my bitch to me at home all the day. C.S., Kirkham.

19.12. 6 A.M. this morn engaged upon the bench and I had the following prisoners to try myself being the only acting magistrate in the Colony at 11 Capt. Johnson Lieut. Lord Lieut. Breedon Mr. Bowden Surgeon attended the Court.

			Lashes.	
Absent	8	weeks	300	Thos. Tooms for absenting himself from labour & stealing
„	5	„	200	Burchall do.
„	3	„	100	Plunkett do.
„	11	„	300	Duff do.
			100	Crener for robbing Kennedy's garden.

After the Court I took a walk with the Govnr at 2 p.m. Capt. Johnson Mr. Bowden calld upon me. C.S., Kneetsford.

20.12. 6 At 11 I went out afishing had very bad success the day cold and my man Earl killd me a couple of ducks and a pigeon the wind blowing hard from the west. At 11 the punishment of the prisoners took place. C.S., Lancaster.

22.12. 6 At 11 I went out afishing and caught some flatheads the wind blowing a strong sea breeze. Came home to dinner at 5 p.m. at 6 went out again in the bay opposite my house and caught some rock codd and a large barracoota measured 4 feet 2 inches long and weight 6lbs.½. C.S., Longford.

24.12. 6 A.M. the day remarkably hot blowing fresh from the N.W. at 1 p.m. waited upon the Govnr. Thomas Salmon came in from the bush. Henry Hatkin returnd from the Houin with 100 swans which were delivered to the prisoners in the eve calld upon McCauley. Xms eve, the day very hot at ½ past 3 p.m. the thermometer was 102. C.S., Leeds.

7. 1. 7 The morning fine after the rain at 11 I went across the water and killd three snipes came home late to dinner. C.S., Cheshire.

18. 1. 7 A.M. at 11 performd divine service 5 p.m. dind with Captain Johnson and bought a dog name Chance gave him £25 for it. C.S., Middleton.

25. 1. 6 A.M. at 11 performd divine service. At 4 p.m. I dind with the Lt. Govnr. We got exceedingly merry. C.S., Moreton.

11. 2. 7 A.M. at home all the day. At 4 p.m. Lieut. Laycock of the New South Wales Regt. and 4 men armd arrivd here by land from the settlement at Port Dalrymple. They were 9 days from the settlement but 7 walking it the first party that have ever come from Port Dalrymple. He came to inform His Govnr of the distress of that settlement. We can afford no relief. C.S., Penrith.

20. 2. 7 A.M. at 11 sat upon the bench to try a prisoner which was sent in from the farm this eve Henry Hatkin returned from going part of the way with Lt. Laycock to Pt. Dalrymple. the wr. very hot. We had a very small shower of rain this eve—sea breeze strong. C.S., Portsmouth.

24. 2. 7 A.M. at 12 waited upon the Lt. Govnr and informd him of Stokes conduct. He begd of me not to punish him. The distress of the Colony very great Meat 3.6 per lb. very small fish 2/- per doz. the flatheads which are by much the most plentiful in the River. Wheat not to be obtained at 6£ per bushell and barley 5£ per bushell—Salt pork 2/6 and 3s. per lb. Potatoes 1.6 per lb. Rio Tobacco £2.10.0 per lb. and very difficult to be obtaind. Sugar very coarse at 1£ per lb. not a piece of lump sugar in the Colony. C.S., Ramsey.

2. 3. 7 A.M. at 9 Mr. Harris breakfasted with me. Afterwards walkd to the farm. there met all the settlers upon business concerning a public road. . . . C.S., Rochester.

5. 3. 7 A.M. at daylight Lieut. Lord took his boat and went down the River, on going, observd a brig laying in Kangaroo Bay made sail to her. At sunrise she fird a gun the whole of the prisoners were so rejoiced that they gave three cheers, at 8 a boat came from her with Capt. Forrest who had the *Sydney* the brigs named *Dutchess of York* from India in 2 months passage Captain Forrest in going to India in the *Sidney* had the misfortune to run his ship upon a reef of rocks, lost the ship and himself and 49 men took to the launch and long boat and with difficulty in 49 days reachd Amboida. at 1 p.m. I went on board the *Dutchess of York*, 3 Capt. Forest and self came on shore and at 4 Capt. Johnson Forrest and self dind with the Lt. Govnr. C.S., Forrest.

6. 3. 7 A.M. at home all day the people employd in getting things from the ship at 5 p.m. I dind at Lt. Lords but was very unwell was obligd to come away very early. C.S., Arrival.

7. 3. 7 A.M. at 9 took a walk with Capt. Johnson and Forrest 12 the Govnr and self with Mrs. P. went on board Capt. Forrest's ship and took Clifford. We stayd there some time. a quantity of spirit was landed and almost every body was drunk.

8. 3. 7 A.M. at 11 the Lt. Govnr and self with Capt. Forrest took a walk Divine service was not performd
unwell that I could not dine at Capt. Johnson. C.S., Rugby.

9. 3. 7 A.M. this day a quantity of spirits was landed I got 223 gall. from the ship and many things unwell that I could not dine at Mr. Bowdens. C.S., Rye.

10. 3. 7 A.M. at 10 I went on board the *Dutchess of York* 5 p.m. Capt. Johnson Lt. Lord Lt. Breedon Capt. Forrest Lt. Rankin Mr. Fosbrook Mr. Janson and Mr. Bowden dind with me. C.S , St. Albans.

11. 3. 7 A.M. at 1 p.m. Mr. Bowden and self went on board. At 5 p.m. I dind at Mr. Fosbrooks and met the same party. C.S., St. Ives.

12. 3. 7 A.M. at home all day. C.S., Saltash.

13. 3. 7 A.M. this morn I took a long walk with my gun at 5 p.m. I dind with Mr. Janson and met Mr. Fosbrook, Bowden, Lt. Lord. C.S., Salthill.

15. 3. 7 A.M. divine service was not performd being busy in clearing the ship at 10 p.m. we had a fine shower of rain which we had not had for 5 months in the eve I hurt myself violently with a fall from my steps of the door. C.S., Selkirk.

29. 3. 7 A.M. at 11 performd divine service. I had the New Surplice for the first time. C.S., Stains.

16. 4. 7 A.M. at home all the day. 1 p.m. the Lt. Govnr paid the Royal Marines a second payment since they came from England, 1803. C.S., Tooting.

28. 4. 7 A.M. the wr. very fine after the gale. At 9 sent for the bakers and reduced the price of bread a fine loaf 2lbs. for 4s. before 5s. Afterwards walkd to the Govmt Farm killd 6 wattle birds, sowd parsely seed the eve rain, sent my men out after crayfish to Browns River. C.S., Ware.

29. 4. 7 A.M. the morning very fine after the rain. At home all the morning. Lt. James McCauley went out to try his new bitch. My men came home with crayfish some very large about 3 dozen and some perch. C.S., Warwick.

2. 6. 7 A.M. at home all the day this my birth day aged 44. In the eve I gave my men spirits. Shaffart made me a very excellent cake with the letters upon it The Rev. R.K. Capt. Bunker in the *Elizabeth* saild for Frederick Henry Bay. C.S., Spencer.

21. 6. 7 A.M. the wr. very cold I have been unwell since the 2nd June at 5 p.m. dind with Mr. Bowden and met Capt. Johnson Lt. Lord, Lt. Breedon Mr. Fosbrook and Mr. Humphrey came home at 8 very unwell, a very severe frost this eve. C.S., Deal.

25. 7. 7 A.M. the morning blowing hard with rain till 8 when it began to clear up at 11 I went Capt. Johnson calld upon me and took a kangarro stake afterwards I went to his house with him. This day Hopkins servt to the Lt. Govnr opend a Publick House the sign of the Whale Fishery, and at 8 p.m. Capt. Johnson Lt. Lord Lt. Breedon Mr. Janseon Mr. Bowden, Humphrey and self suppd there myself in the chair. At ½ past 11 we came away, the wr. very wet and cold.

Mr. Collins house was robbd of property to the amount of 250£ or 300. C.S., Weston.

6. 9. 7 A.M. at home all the morning. 2 p.m. I took a walk and observd a boat coming up the river on my return I receivd two letters from England one from Lord Spencer and Mr. Austin by the ship *Sarah.* Capt. Bristow who left this settlemt on the 4th August 1806 in the ship *Ocean.* His Lordship informd me that he had receivd an offer black swans safe by the *Carlton* whaler Captain Hatcrow. C.S., Hereford.

11. 9. 7 A.M. this morn I sent His Honor the Lt. Govnr 21 heads of asparagus. at 1 p.m. I waited upon the Govnr and we took a long walk afterwards he read to me an account of the death of Lord Claremont. This day I received a very large Cheshir cheese of 60lbs. from Lord Spencer and a barrel of porter, but by some means the cask was not more than half full only 25 gallons. Marsh one of the bushrangers came in and the Govnr punishd him 300 lashes. C.S., Enderby.

28. 9. 7 A.M. at home all the day. I sent my man to the farm for the cow and calf, but the calf was lost. Mr. Clark sent me word. C.S., Abbott.

11.11. 7 A.M. at 9 Mr. Shipman came and measured two acres of land for me which I gave a grant to my friend Mrs. McCauley. at 4 p.m. Mr. Shipman and Mr. Chase who married the Lt. Govnr daughter dind with me. C.S., Brampton.

2.12. 7 A.M. at home all the morning. at 5 p.m. Lieut. Kent H.M. ship *Lady Nelson* Capt. Patterson of the *City of Edinborough* and Mr. Berry and Lt.

Lord and Mr. Harris Mr. Fosbrook Mr. Janson and self dind at the Governors in his new house the first time that he dind there. C.S., Caledon.

25.12. 7 A.M. at 11 performd divine service attended by Lt. Govnr Collins &c. &c. and the whole of the service was performd and for the first time I read the prayers out of the new Prayer Book and Bible presented to the Colony by His Majesty King George the Third. at 4 p.m. Mr. Berry and self dind with the Lt. Govnr. C.S., "Xms."

17. 1. 8 A.M. early this morning a gun was fird from a ship in Sandy Bay a boat was sent down with the pilot H.M. ship *Porpoise* arrivd from Norfolk Island with 180 settlers with thirty chl. for this Colony and at 10 she anchord in the bay. At 11 performd divine service. At 2 p.m. several of the officers of the *Porpoise* calld upon me. C.S., Simmons.

21. 1. 8 A.M. at 11 I went across the water to shoot pigeons and returnd 2 p.m. this day finish my new barn 30ft. long 16ft. wide. C.S., Ellison.

29. 2. 8 This morn upon business at Court. In the eve I met with a dreadful accident fell from the steps of my door and cut my thigh by falling on the scrape. C.S., Minto.

24. 3. 8 This morning Mr. Harris calld upon me with Mr. Bowden at 1 p.m. I waited upon the Lt. Govnr the first of my walking up Town since my accident happened I took wine with him and in the aft. he sent me some Mellon. Mr. Humphrey calld upon me.

3. 4. 8 A.M. the morn performd divine service the first after my illness and took refreshment at Govmt House afterwards. I killd a white hawk. C.S., Breedon.

1. 5. 8 At 2 p.m. Mr. Humphry and self with 4 men got into my large boat and went up the river to Mr. Faulkeners where we intended to sleep at his house but meeting with some of the prisoners there made a fire and slept out by the river side.

2. 5. 8 Soon after breakfast we got into the boat and proceeded up the river. I killd 2 ducks and sent the men out akangarooing they had no success made a fire got our dinner and slept there it was a dreadful cold night.

3. 5. 8 At daylight we sent out 2 of our men akangaroing and they were to meet us at the first river. I killd a duck and they brought 1 kangarro. Breakfasted there and at 12 proceeded up the river to the first fall. Got there about 4, took refreshment and came down to Dennis McCartys where we dind sent the men to fish for eels, they caught some and we had them for supper, slept there and had a very wet night, the house was not coverd in.

4. 5. 8 A.M. at 12 we made sail and came down the river the wind fair till we came to long reach when it blew a gale of wind against us. It was with great difficulty that we could keep the boat off shore, the sea ran very high. At 7 oclock as we came by Hunters Island we heard 4 guns fird from a ship in the River, and the Lt. Govnr sent a boat down the river, when I got home Mr. Littlejohn was at my house.

2. 6. 8 A.M. the morning very fine this day I gave my men some meat and spirits, it being my birth day. C.S., Madrass.

13. 7. 8 Early this morn I took my boat and went over to Ralphs Plain where I had 400 acres (21) of glebe land markd out by Mr. Shipman and in the eve I returnd home. C.S., Cooke.

SHIPPING & WHALING.

6.3.1804 . . . At 6 a.m. H.M. brig *Lady Nelson* (22) saild for Pt. Jackson with a fair wind.

10. 3. 4 At 4 a schooner appeard in sight. Name, the *Pilgrim,* Capt. Dillano who has the *Perseverance.*

24. 3. 4 . . . Saild the *Ocean* transport to Pt. Philip for the civil, military officers, &c. &c.

26. 3. 4 A.M. at 6 saild the American schooner Capt. Amasa Delano for Kents Bay.

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(21) Knopwood, later in life, retired to this property at Rokeby.
(22) The *Lady Nelson,* a brig of 60 tons.

18. 4. 4 A.M. at ½ past 6 Capt. Bowen and Mr. Wilson from Risdon Cove, calld on me and took me with them to Ralphs Bay where we breakfasted on shore, and walkd to Frederick Henry Bay. Many of the natives were there. At ½ past 8 we went on board the *Integrity* [23] cutter from Kents Bay, commanded by Mr. Rushworth.

23. 4. 4 . . . Saild this morn the *Pilgrim* schooner Capt. Dillans to the South Cape asealing.

24. 4. 4 . . . This day twelvemonth we weighd anchor, and anchord at St. Helens in company with the *Ocean* transport.

25. 4. 4 . . . Saild the *Integrity* cutter for Sidney, Mr. Rushworth commander.

6. 5. 4 . . . at 1 p.m. anchord in the Bay the *Nancy* [24] cutter from Port Jackson with dispatches for Lt. Gov. Collens.

18. 5. 4 A.M. saild at 7 the *Nancy* for Kings Island asealing.

19. 5. 4 . . . at 6 p.m. the *Nancy* in sight working out of the river.

8. 6. 4 A.M. at 10 Mr. Wilson came to the camp. At 11 I went to the Island to look out for the *Ocean*. At 2 p.m. I took a walk, and in the eve drank tea with Mr. Lord. At 4 a.m. Mr. Collons the harbour master went in the white cutter to Betsey's Island to land 2 convicts there, to keep a look out for ships, and to make a signal at the appearance of any—by fire. C.S., St. Vincent.

10. 6. 4 . . . at 8 p.m. the white cutter returnd with Mr. Collens the harbour master from Betsey's Island.

12. 6. 4. A.M. Very strong breezes. At 12 Capt. Bowen in the whale boat and Mr. Brown with him Mr. Mountgarret in his boat went to Adventure Bay. They past the camp at ½ past 12. I walkd to the farm. At 4 heavy squalls which continued all night. C.S., Goldsmith.

14. 6. 4 A.M. at ½ past 2 continued bad wr. A gun was fird from Hunters Island as signal that a fire was seen upon Betsey's Island. The day very bad. Do. wr. at 3 p.m. More moderate. Mr.

(23) The *Integrity*, a cutter of 59 tons, built in Sydney, 1802-04.
(24) The *Nancy*, a 20 ton sloop, built at Hawkesbury River, N.S.W.

Collins the harbour master, went into Ralphs Bay where he was to continue all night. C.S., Cornwell.

22. 6. 4 A.M. at 7 Mr. Collens in the white cutter and black boat went into Ralphs Bay with an intention to go to Frederick Henry. Continual rain all this morn. At 4 p.m. we observd a ship coming up the river. At 9 Lt. Johnson landed from the *Ocean* which had brought the party we had left at Pt. Philip after a passage of thirty three days during which she had a gale; 21 days laying under her bare poles expecting for some days that the ship would have went down, the sea so high and the wr. so bad. C.S., Coke.

23. 6. 4 A.M. moderate. The *Ocean* under sail. At 11 Mr. Mountgarret and Mr. Brown came from Risdon. At 4 p.m. I went there with them, and slept at Mr. Mountgarrets. C.S., Ocean.

24. 6. 4 A.M. at 11 performd divine service. At 5 p.m. came home and waited upon the Lt. Govnr. *Ocean* not come up. C.S., Mansfield.

25. 6. 4 The *Ocean* under sail. At 4 p.m. she came to an anchor in Sullivan Cove. At 5 I dind with Lt. Lord and Lt. Johnstone. In the eve Capt. Mertho and Lt. Sladden and Mr. Janson came there. The camp equipage landed. C.S., Mertho.

1. 7. 4 At ½ past 10 Lt. Johnston and self went to Risdon by order of Lt. Govnr Collins, and performd divine service there. We passed so many whales that it was dangerous for the boat to go up the river, unless you kept very near the shore. At 4 p.m. we dind with Capt. Bowen, and Lt. Sladden came there in the eve.

27. 7. 4 . . . And ½ past 4 Capt. Bowen, Mr. Wilson and self got into a boat and landed at the settlers. We see a great many porpuses and a very large whale near us.

28. 7. 4 A.M. at 12 Mr. Mountgarret calld upon me, and we both went on board the *Ocean*.

31. 7. 4 . . . At 10 p.m. a boat arrived in the cove from the *Alexander* whaler, Capt. Rhodes belonging to the house of Mr. Hurry. Capt. Mertho's house. She had been in the south seas and had very great success. I got my certificates signed.

1\. 8. 4 A.M. Mr. Rhodes the Master of the *Alexander* whaler, breakfasted with the Governor and afterwards calld upon me. He informd me that he had some things from Port Jackson for me.

2\. 8. 4 . . . Mr. Rhodes went early in the morn to his ship at Adventure Bay. At ½ past 10 Henery Hakin went in the white cutter for the Lt. Governors dispatches.

4\. 8. 4 . . . Henry Hakin the Lt. Governors coxwain and pilot returnd from the ship *Alexander* in Adventure Bay. He brought me a dog from Lt. Houston and informd us that he see a ship at a distance out of the river.

5\. 8. 4 A.M. The *Ocean* transport was to sail this day but was prevented. The Governors despatches were not ready. At 5 p.m. a boat arrivd from the *Lady Barlo* a ship from Port Jackson with cattle &c. Sent all my letters on board the *Ocean* Capt. Mertho. The Lt. Governors coxwain went down to the *Lady B.* to pilot her up.

7\. 8. 4 A.M. at 11 we observd the East India Company ship *Lady Barlow* beating up the river. Lt. Johnson dind with me. At 8 she anchord in Sullivan Bay.

9\. 8. 4 A.M. at 8 this morn saild our friend Capt. Mertho, who commanded the *Ocean* transport, which came from England in company with H.M. ship *Calcutta* Capt. Dan Woodriffe. The *Ocean* brought out settlers stores &c. for the colony at Port Phillip under the command of Lt. Gov. Collins of the Royal Marines. The settlement at Pt. Phillip did not succeed, and the *Ocean* removed it to the River Derwent, Van Diemens Land. C.S., Success.

10\. 8. 4 At 4 p.m. the *Alexander* whaler, anchord in Sandy Bay near the east side of the River, to take whales. At 5 Capt. McAskill and self dind with Lt. Johnson. At 8 he went away. ½ past Capt. Rhodes of the *Alexander*, whaler, came and calld upon me there. He slept at my marquee.

12. 8.	4	A.M. the *Alexander* whaler Capt. Rhodes, caught 2 whales opposite the Camp. At 3 p.m. the following gentlemen dind on board the *Lady Barlow* with Capt. McAskill:—Lt. Governor Collins and Mrs. Powers, Capt. Sladden, Lt. Johnson, Lt. Lord of the Royal Marines, Wm. Janson, Mathew Bowden, Leonard Fosbrook, G. P. Harris, and self. We were all very merry. C.S., Long Live.
13. 8.	4	. . . The *Alexander* whaler caught a very fine whale.
26. 8.	4	. . . Saw Capt. Rhode of the *Alexander*, whaler kill 2 whales.
4. 9.	4	. . . My boat was finishd.
5. 9.	4	A.M. at 11 I walkd to the farm where I took my boat and went to Risdon Cove with my dogs. At 4 p.m. went and killd a large kangarro. I slept at Mr. Mountgarret's house that was. Rain and snow. C.S., Genner.
7. 9.	4	A.M. at 10 saild awhaling the *Alexander* ship Capt. Rodes to Adventure Bay.
23.10.	4	. . . At 10 the Lt. Governor and self in his boat went across the river to see what ship was coming in. At 12 we returnd and concluded it to be the *Alexander* whaler Capt. Rhodes. At 8 p.m. a boat came on shore with the Captain.
4.12.	4	. . . At 11 I went on board the *George* schooner.
6.12.	4	. . . At 4 Mr. Harris, Fosbrook, and Capt. Stewart of the *George* schooner dind with me off mutton.
11.12.	4	At 6 the *George* schooner Capt. Steward got under weigh and went down the river to Kings Island for seal skins.
14. 1.	5	Ship *Myrtle*, Capt. Barber from Bengal. Laden with spirits, rice, and sugar.
16. 1.	5	The *Myrtle* arrivd in Sullivan's Cove and saluted the Govnr. with 11 guns.
5. 1.	5	Ship *Sophia* from Sydney.
18. 2.	5	A.M. at 4 saild the ship *Myrtle*, Capt. Henry Barber, for Norfolk Island and to the North West Coast of America.
3. 3.	5	*Nancy*, schooner, from Port Dalrymple. As she came past Oyster Bay she took up 3 men that belonged to the *Sophia*, that were sealing there.

The natives had destroyed about 2,000 skins which they had taken since they were on the island.

7. 3. 5 *Sophia* saild.

9. 3. 5 *Nancy* saild for King Island. A boat arrivd from the *Sophia.* Contrary winds had prevented her leaving the river.

7. 5. 5 I heard a whale in the river this eve.

9. 5. 5. Enquiry re/plan of certain prisoners to steal the new whale boat and voyage to New Zealand.

9. 6. 5 A ship in sight.

10. 6. 5 Whaler *Richard and Mary* out 18 months from London, Captain Lucas.

14. 6. 5 A boat came up the river from the *Good Intent,* Schooner, Mr. Kelly, Commander, from King Island.

24. 6. 5 A.M. at 8 I was informd that six men had deserted from the camp and had taken my boat with them, and the Government oars. Camel and Fernsfort took my boat away to the point where they had planted something.

26. 6. 5 A.M. saild this morn the Schooner and a party of marines with Hakin in it.

1. 7. 5 A.M. the whale boats brought a whale which they had killd in Sandy Bay.

2. 7. 5 A.M. at 11 I went on board the *Richard and Mary,* Whaler, Capt. Lucas. They had finished cutting the whale. It was very large. 5 p.m. at 5 the Gov's son dind with me. The time twelve months the river was full of whale.

16. 7. 5 A ship was seen off Storm Bay.

18. 7. 5 Whaler, *King George,* anchord in Sullivan's Cove.

19. 7. 5 A.M. at 11 a large whale opposite my house and two boats from the *King George* whaler after her. They killd the calf, but she went down immediately. They did not kill the cow. At 2 p.m. I took a walk to Sandy Bay and see some pigeons, it is remarkd that the bronswing pigeons have not left us this winter, which shows it is not so severe as last.

20. 7. 5 A.M. at 9 the boats were after whale in the river. At home all day.

21. 7.	5	Whaler, *King George,* went down the River.
23. 7.	5	*Sophia,* Capt. Collins, from Sydney anchord in Cove.
25. 7.	5	The vessels that are whale fishing here are the *Richard and Mary,* whaler, Capt. Lucas of the house of Lucas & Co., London *King George,* Whaler, Capt. Moody, owners Lord, Cable, and Underwood, Sydney. *Sophia,* ship, Capt. Collins, owner Camel, Sydney. *Recovery,* schooner, Capt. Kelly belonging to the house of Camel.
26. 7.	5	*Richard and Mary* (having secured many whales in Frederick Henry Bay) anchord opposite the town.
28. 7.	5	A.M. at home all the day. A great many whales in the river beyond Hobart Town.
31. 7.	5	A.M. at 11 I walkd towards Sandy Bay to kill a few whattle birds. In coming home I see a kangaroo and set my Nettie at it she drove it down towards me, I shot at it and killd. 4 p.m. calld on Capt. Lucas who informd me they had killd many whales at Frederic Henry Bay. At 10 p.m. his ship anchord opposite the town.
2. 8.	5	A.M. at 11 I took a walk and met my man who came down in Clark's Boat from Herdsman's Cove having killd 2 Kangaroos and 2 Emews at 3 p.m. Mr. Lucas's Man caught a large whale near Hobart Town and while they were towing it to the ship a whale was aground opposite my house upon the shore but got off again. Not a glass of spirits in the Colony to be had.
10. 9.	5	"*Ocean,* whaler four months since from England in Adventure Bay where she had been 28 days and taken 60 tonns of oil."
16. 9.	5	*Ocean,* whaler, saild from Adventure Bay.
21. 9.	5	The *King George,* Whaler, Captain Moody, came from the East side of the Bay from Adventure Bay where it had been whaling to land his oil with Mr. Collins.
27. 9.	5	At 9 I went across the River to see the Try Works. They had a great quantity of oil in cases. Mr. Collins bought 100 tun of oil from Capt. Moody of the *King George* Whaler which he had caught since she had been in the river.

29. 9.	5	At 11 saild the *King George* Whaler.
3.10.	5	A.M. at 11 two strange boats were seen coming up the River. 12 they arrivd at Hobart Town. The men came from Schooting Island as they had no provisions left and 4 came in my boat to my great joy. 2 p.m. I went to the Guard House where the boats lay and the Govnor came to me. He gave me the joy of the return of my boat.
4.10.	5	The *Sophia* anchord in the Cove. She came from Frederick Henry Bay with oil.
5.10.	5	A.M. at 7 saild the *Richard & Mary,* whaler, Capt. Lucas to Sydney.
14.10.	5	A.M. at 8 the Schooner *Recovery* which had been awhaling here sometime saild for Sydney.
16.10.	5	This day saild the *Ocean,* whaler, Capt. Bristow from Adventure Bay where she got 70 tun of black whale oil in a month to Norfolk Island from thence to New Zealand for Spermat Oil. The *Ocean,* whaler, was only 20 days in Adventure Bay and took 60 tun of oil for when the season closes the fishery opens in New Zealand.
17.10.	5	Capt. Lucas ship, the *Richard and Mary,* was obliged to weigh anchor and go up the river she brought four whales up to the try potts.
17.10.	5	A.M. at 8 the *Sophia,* Mr. Collins, saild for Sydney.
23.10.	5	*Governor Hunter*, Schooner, anchord in the Bay and by her arrivd 582 bushels of wheat and pork to the very great comfort of the Colony (25).
3.11.	5	This morn saild the *Governor Hunter,* schooner, for Port Jackson.
5.11.	5	*H.M.S. Buffalo* anchord in Cove at ¼ past 4. She came from Sydney with a few provisions.
13.11.	5	*H.M.S. Buffalo* saild.
28.11.	5	At 12 a signal was made that a ship was in sight. 4 p.m. she anchord in the Bay. The ship *Sydney,* Capt. Forest, from Norfolk Island and by her returnd Lt. Lord.

(25) For weeks previously the inhabitants had been reduced to famine rations.

4.12.	5	The ship *Sydney* went across the River to the Try Works to take in oil.
12.12.	5	A.M. the *Sydney* came near Hobart Town and anchord.
18. 1.	6	The *Marcia* (26), schooner, arrived from Port Dalrymple.
19. 1.	6	The *Sophia*, Mr. William Collins, from Sydney, anchord in the cove. Brought 110 bushels of maise.
21. 1.	6	The *Marcia* saild.
1. 2.	6	A.M. at 6 the *Sophia* went out of the bay and anchord in the middle of the River.
17. 2.	6	A.M. at 12 I calld upon Lt. Govnr. Collins and he informd me that he was going to send a letter to the officers at 4 p.m. Mr. Fosbrook and Mr. Bowden calld upon me. This day a whale boat belonging to Messrs. Cambel & Co was upset in the river and 2 men lost in it. I had permission to go down the river.
11. 4.	6	A.M. this day a whale was seen in the river near Ralphs Bay.
12. 4.	6	A schooner from Port Dalrymple anchord in the Bay.
21. 4.	6	A.M. at 7 saild the *Estremina*, Lt. Oxley.
13. 5.	6	*King George*, Whaler, arrivd from Sydney, bringing letters which had reachd Sydney in the *Wm. Pitt.*
16. 5.	6	A.M. at 8 I see three boats from the *King George*, whaler, off after whales in the River.
18. 5.	6	Saild the *King George* to Frederick Henry Bay awhaling.
6. 6.	6	Early this morn I went to Ralphs Bay with my gun. . . . Returnd in eve. . . . Observd a strange sail in Frederick Henry Bay.
7. 6.	6	I gave information to the Governor of the ships in Frederick Henry Bay.
8. 6.	6	A.M. divine service could not be performd. At 10 three whales in front of my house. Mr. Collins sent 2 boats after them. I dind with the Lt.

(26) The *Marcia* was a schooner of 26 tons belonging to Kable & Co., of Sydney.

Govnr. 6 Mr. Collins sent word to the Governor that he had killd one of the whales in Farm Bay. A very cold day. The Lt. Governor sent a boat down into Frederick Henry Bay to see what ship it was.

9. 6. 6 A.M. at 8 this morn Mr. Collins men with 2 boats had the whale in tow down the river to the Try Works. The weather very fine. in the eve the Govmt Boat returnd from Frederic Henry Bay —the ship was the *Carlton* privateer from Liverpool the Capt. was to come up as the next morn to wait upon the Lt. Govnr.

13. 6. 6 A.M. the day very fine at 12 I went out and killd some wattle birds. P.M. some whales opposite the town.

10. 6. 6 The Captain of the *Carlton* (Capt. Hatcrow) waited upon the Lt. Govnr.

22. 6. 6 A.M. the day very cold at 12 Capt. Johnson calld upon me and we took my glass and observd 2 boats of Mr. Collins fast to a whale ½ past 1 we calld upon the Judge Advocate. 4 p.m. dind with His Honor the Lt. Govnr. This morn the Lt. Govnr sent a boat into Storm Bay Passage to see if there were any strange ships there.

24. 6. 6 A.M. the day very fine but very cold At 3 p.m. a boat arrivd from Adventure Bay from the *Ocean*, Whaler, Capt. Bristow. At 5 p.m. I dind with Capt. Johnson and met Capt. Sladden and Lt. Lord.

25. 6. 6 A.M. at 11 the magistrates met upon business, many whales in the river.

1. 7. 6 A.M. at ½ past 8 Capt. Johnson and Lt. Lord went down in my boat to Storm Bay Passage to go on board the *Ocean*, whaler, Capt. Bristow. At 10 p.m. they returnd and in coming back the boat was charged by a cow whale. She struct at the bow but fortunately they did not hit it with her fins.

5. 7. 6 A.M. upon business this morn the day very wet and many whales opposite the house.

14. 7. 6 A.M. at 12 I went with my boat to the *Carlton*, Capt. Hatcrow who was awhaling down the River. At 3 p.m. I got on board. They were busey in boiling the blubber. 5 p.m. the boats came up with a large whale.

15. 7. 6 A.M. at 10 Capt. Hatcrow and self went on shore in my boat, his boats were off after whales. 3 p.m. we got on board. Lt. Lord came to the ship and Capt. Bristo of the *Ocean* whaler. 4 p.m. Capt. Hatcrow boats brought up a very large whale.

16. 7. 6 A.M. this morn blowing very fresh from the south. We remained all on board Capt. Hatcrow's boats out awhaling. 4 p.m. the boats returnd with a very large whale. 5 p.m. moderate wr. and Capt. Bristow went on board his ship.

17. 7. 6 A.M. the whale that they brought on board yesterday made 90 barrels of oile. We dind on board at 3 p.m. Mr. Lord and self came to Hobart Town. In the eve suppd with Lt. Lord.

20. 7. 6 The *King George*, whaler, Capt. Moody anchord in the bay. The distress of the Colony for want of grain that the rations are viz To the officers 3lbs. of wheat & 8lbs. of kangaroo. To the prisoners 2lbs. of Indian corn and 8 of Kangaroo.

30. 7. 6 The *King George*, whaler, saild.

1. 8. 6 A.M. at 7 Lt. Lord and self went in the Govmt Cutter to Capt. Bristow's ship in Storm Bay Passage.

4. 8. 6 At 10 saild the *Ocean* whaler from Storm Bay Passage for England.

5. 8. 6 A.M. at 4 I was informd that a ship was come from Sydney, the *Estremina*, brig with provisions for the Colony. At 1 p.m. information was given that ship was at anchor in the River. 3 p.m. she anchord in the Bay. *the Criterion* from Sydney, last cargo, of Tea, Nankin and China. When the *Estremina* arrivd we had only provisions for 2 servings a week.

10. 8. 6 2 p.m. saild the *Criterion*, the Mexican ship, commanded by Mr. Chace.

14. 8. 6 A.M. at 8 saild the *Estremina*, Lt. Simmonds, for Port Jackson.

18. 8. 6 At 3 p.m. the *Carlton*, letter of Marque, stood up the River. At 6 she anchord on the east side of the River. The wind contrary for her coming up.

19. 8. 6 At 8 the *Carlton*, letter of Marque, working into the Bay. ½ past 11 she anchord and fird salute which was returnd by the Garrison.

22. 8. 6 A.M. at 8 the colours were hoisted on Hunters Island the Lt. Govnr. having appointed this day to be observed as a day of thanksgiving for the late glorious success which attended His Majesty's arms over the combined fleet of the enemy off Cape Trafalgar on the 21st day of October last. At 12 a Royal Salute was fird from the Ordinance on parade and Capt. Hatcrow fird a Royal Salute from the *Carlton*, Letter of Marque.

1. 9. 6 At 8 a.m. I launch my new boat calld the *Spencer*.

2. 9. 6 Sent my new boat to be riggd.

4. 9. 6 A.M. at 7 saild the *Carlton*, Letter of Marque for Liverpool (Capt. and Mrs. Sladden left on this vessel).

4.10. 6 Mr. Collins this morn went upon Mount Direction to look for a ship.

6.10. 6 At 1 p.m. blowing a very heavy gale from the West. at 3 Mansfield came down to the Governor and informd him there was a ship arrivd in Frederick Henry Bay and that an officer of the R.M. one Henry Hakin was at his house. The Lt. Govnr sent a boat up for him. The same eve they landed, the ship was the *King George*, Whaler from Sydney.

9.10. 6 This day three years at 20 minutes past 10 a.m. we arrivd at Port Philip.

10.10. 6 At 3 p.m. arrivd the *King George*, whaler, Mr. Moody from Sydney with a supply of salt provisions.

19.10. 6 A.M. at ½ past 6 saild the *King George*, Mr. Moody.

21.10. 6 At ½ past 9 a signal made that a strange sail was in the River.

22.10. 6 11 the ship *Ferret*, Letter of Marque, a whaler belonging to the house of Bennet & Co of London,

commanded by Capt. Phillip Skelton anchord in the Bay. She left England on 3rd June and stopd only at Jago Prage Bay.

1.11. 6 At 6 p.m. the Govnr. punishd 6 men from the ship *Ferret* with 200 lashes each because they refused to let 2 casks of biscuits and 3 of flower land for the relief of the colony.

13.11. 6 A.M. at 11 waited upon his Honor the Lt. Govnr. 2 p.m. went out afishing. Anchord in the Bay the *Ferret*, whaler, from a cruse she did not kill any whales. Rain very much wanted.

24.11. 6 A.M. at 9 I went down the river into Ralphs Bay and see the Try Works with Mr. Groves.

1. 2. 7 A.M. at 11 performd divine service. 4 p.m. I dind with the Govnr at 6 Mr. Collins boat came up the river from Cape Barren where they had been sealing since September killd 2000 seals.

4. 3. 7 A ship reported.

5. 3. 7 The *Duchess of York*, brig, Capt. Forrest, two months out from India arrivd.

19. 3. 7 A.M. at 7 the *Duchess of York* moved out into the fairway. H.M. Brig *Estremina*, Lt. Symmonds, from Port Jackson arrivd.

22. 3. 7 ½ past 11 *Duchess of York* saluted with 11 guns and made sail for Port Dalrymple.

26. 3. 7 The *Ferret*, whaler, anchord. She had come from the coast of New Zealand where she had met bad weather. Just before making for the Derwent the *Ferret* had sighted the *Two Brothers*, 5 months and 10 days out from England.

30. 3. 7 In the eve Mr. Collins arrivd with the *Govnr. Hunter*, schooner.

2. 4. 7 This morn early saild H.M. Brig *Estremina*, Lt. Symmons, for Port Dalrymple.

19. 4. 7 This morning saild the *Govnr. Hunter*, schooner for Cape Barren after seals.

20. 4. 7 At 7 p.m. a strange boat came up the river and brought the Cap. of the ship *Aurora* which was in Frederick Henry Bay.

1. 5. 7 The *Aurora*, whaler came and anchord in Ralphs Bay, Capt. Merrith.

9. 5. 7 At 11 information that a large ship was standing up the River. At 7 p.m. anchord in the Bay the *Eliza*, whaler, Capt. Bunker from Port Jackson, belonging to the house of Bennet & Co., London. She was from England 18 months has been off the coast of New Zealand.

16. 5. 7 A.M. this morn the Govnr. sent for me to try Garret a prisoner for purchasing stolen property from the ship *Elizabeth*, Capt. Bunker. At 1 p.m. I went on board to take refreshment with Capt. Bunker.

18. 5. 7 Saild the *Elizabeth*, Capt. Bunker to Frederick Henry Bay awhaling.

30. 5. 7 A.M. blowing very hard. At 11 the *Aurora* and *Elizabeth* anchord near the town. In the afternoon Capt. Merrick and Capt. Bunker came up to Hobart Town.

31. 5. 7 A.M. at 7 Capt. Merrick went on board the *Aurora* and at 11 seeing a whale he went after it with only one boat, he struck her and when she rose again he put another iron into her, she then turned and struck the boat and stove it that they were obliged to cut the ropes which held the whale, the boat filld so fast that they were obligd to hand on their oars in that dreadful state they continued. One man was knockd over when the whale struck the boat and went down at 1 p.m. Another of the men died in the boat, and at 2 another died. Capt. Merrick and 2 men continued in the boat with the water up to their waists till a boat from the *Elizabeth* came to their assistance, and had not the boat fortunately arrived every soul must have perishd as they were so deep in the water and they began to be stiff with the cold water.

1. 6. 7 A.M. at 11 the Lt. Govnr sent for me and requested that I would bury 2 men from the *Aurora* Capt. Merrick, at 12 4 boats came up the river 3 from Capt. Mc. and the other from Capt. Bunkers towing the bodies of the deceased. They landed at the Waff and the bodies were attended to the Grave by Capt. Merrick as chief mourner and Capt. Bunker, Mr. Collins and the crew of both ships &c Capt. Johnson Lt. Lord, G. P. Harris

Esqre., at 1 p.m. the corps was put into the ground afterwards we all went to Lt. Lords and took refreshment when Capt. Merrick informd me of the melancholly sceine which took place he said that when he stuck the second iron into the whale that she came up and in cutting her flukes off she went down rose immediately and cut the stern of the boat off one man immediately went down they then cut the stear oar in halves and kept paddling with it by which means Capt. M. and his boatshearer . . . preserved their lives. C.S., Aurora.

3. 6. 7 Capt. Merrick in the *Aurora*, a whaler, saild for Frederick Henry Bay awhaling.

13. 6. 7 Information was given that a ship was come up the river and anchord in Storm Bay Passage.

14. 6. 7 A.M. at 12 Mr. Humphrey landed from the *Albion* were after whales opposite my house at day at 7 p.m. Mr. Humphrey calld upon me. C.S., Humphrey.

31. 7. 7 A.M. at 9 the morning very cold ½ past 1 see many whales opposite my house, making a great noise at 12 calld upon Mr. Bowden who informd me that at 8 this morn there were 17 whales counted at the same time. C.S., Kenton.

2. 8. 7 A.M. the morn remarkably fine at 1 p.m. eight boats belonging to the *Aurora, Elizabeth* and *Albion* were after whales opposite my house at ½ past they killd one at 2 they towd the whale down the river to the ships. Calld upon Capt. Johnson and Mr. Humphrey 4 p.m. I dind with His Honor the Lt. Govnr Collins. C.S., Dunkirk.

5. 8. 7 A.M. at 11 the Lt. Govnr. sent for me and spoke about ironing John Clark. I calld upon Mr. Collins and met Capt. Bunker, Merrick and Richardson there, they came up after whales.

17. 8. 7 Capt. Merrick came up and informd us that Capt. Bunker had gone in his ship to Frederick Henry Bay.

30. 8. 7 At 11 Capt. Merrick and Capt. Richardson came up in their boats and informd the Governor that there was a mutiny on board the *Elizabeth*, Capt. Bunker, the men would not do their duty because

The Govnr sent a guard of Marines on board the *Elizabeth.*

they had a scarcity of provisions. At ½ past 3 the *Elizabeth* anchord in the Bay. At 4 Capt. Johnson and self dind with the Lt. Govnr, 6 Capt. Bunker and Merrick waited upon the Govnr, Capt. M. said that he should sail for England on Tuesday the first of September. C.S., Dickson.

31. 8. 7 A.M. at 11 Mr. Collins Capt. Bunker, Capt. Merrick, and Capt. Richardson calld upon me to see the Garden and grounds which they very much liked. At 3 p.m. I waited upon the Lt. Govnr. 14 men that behavd in a very mutinous manner on board the *Elizabeth*, Capt. Bunker, were landed and put into the military barrack they were ironed and guard over them.

6. 9. 7 2 p.m. I took a walk and observd a boat coming up the river. On my return I received two letters from England, one from Lord Spencer and Mr. Austin by the ship *Sarah.* Capt. Bristow who left this settlement on the 4th August 1806 in the ship *Ocean.* His Lordship informd me that he had receivd an offer black swans safe by the *Carlton* whaler Captain Hatcrow. C.S., Hereford.

8. 9. 7 A.M. at home awriting till 2 p.m. when I delivd my letters to Capt. Bunker. At 3 Mr. Bate the Judge Advocate and Lt. Henderson went on board the *Elizabeth*, Capt. B. for Sydney and to take their passage to England. At 4 saild the *Elizabeth.* This morn I finishd putting in all my potatoes. C.S., Banks.

1.10. 7 A.M. this morning early Garrel and Duce took my boat and went on board the *Sarah*, Capt. Bristow, and 5 men made their escape from the ship. 2 p.m. I waited upon the Govnr. C.S., Powis.

2.10. 7 A.M. this morn saild the *Sarah*, Capt. Bristow, on a whaling voyage. At 10 the sea breeze set in and was obligd to anchor at Trywork Bay. At 7 p.m. the Lt. Govnr sent for me on business at 11 a musquet was fird from the *Sarah* whaler Capt. Bristow and at a qr. before 12 he fird 2 great guns. The Govnr immediately sent a party of the marines on board. C.S., Cullen.

3.10. 7 A.M. at 1 Raphel and Edwards two prisoners attempted to board the ship and were taken by the guard which was left on board. At 6 she saild. 10 the boats left the ship. 11 Mr. Grimes Lt. Piper and Mr. Humphry calld upon me. Strong sea breeze. C.S., Sarah.

6.10. 7 A.M. Mr. Grimes and Lt. Piper calld upon me to take their leave prior to their going to Pt. Dalrymple and at two p.m. they with Mr. Harris and Mr. Humphrey went up to Herdsmans Cove in my large boat. A strong sea breeze. C.S., Harris.

24.10. 7. A.M. at daylight this morning Mr. & Mrs. McC. went in my boat to Brown's River where we dind and at 5 p.m. as we were coming up we observd 2 ships standing up the river. at 6 I waited upon His Honor the Lt. Govnr to inform him of them. C.S., Supply.

25.10. 7 A.M. at 9 His Majesty's ship *Porpoise* anchord in the Bay and fird a salute of 13 guns which was returnd by the Garrison likewise the *Topaz*, American ship, anchord in the bay. At 10 I waited upon the Governor where I see Lt. Simmons who commanded the *Porpoise*. At 11 performd divine service. C.S., George.

31.10. 7 A.M. at 7 I went on board H.M. ship *Porpus* and breakfasted. 8 Mr. Sloane the Purser Mr. Short, Masters mate, and Midshipman C. Collins and self got into the *Porpus* launch with 7 men and went down the river. At 11 we enterd Storm Bay Passage and proceeded to the N.W. Port where we went after some black swans and killd three in Lieut Lord's boat which we borrowd to pull after the swans it being very light. At 5 p.m. we left the Port and proceeded a little way up the Passage. The wind headed us and we anchord in a small Bay, got all our things out of the boat and dressd some dinner on . . . . where we slept.

1.11 7 At 4 a.m. we got into the boat and saild through the passage Passd Houin Island at 7 p.m. landed on an Island next to Gardners Island where we slept.

2.11. 7 A.M. at 4 got into the launch and passd Swan Port [27] then got into the small boat and proceeded up to the Flatts the swanns were in great abundance it came on to blow so hard that the launch was obliged to put back and run into Swanport at 5 p.m. we came down and at 7 landed where we got our dinners and slept there.

3.11 7 At 4 we breakfasted and sent the small boat down to Swan Port and we proceeded in the launch at 5 o'clock the men caught 23 swans and we shot 7. At 1 p.m. the wind came against us and we continued beating up till 9 at night when we landed.

4.11. 7 A.M. at 3 we made sail for Storm Bay Passage the wind strong against us we were obliged to go round Gardners Island. At 12 we left the Houin and anchord off the rock and took refreshment 40 past 2 made sail, but could not get forward we anchord, made a fire on shore and slept.

5.11. 7 A.M. at 3 made sail beating through Storm Bay Passage. At 6 it began to rain at 2 got through the Passage and at 9 p.m. reach H.M. *Porpus*. It continued raining from 6 a.m. to 10 p.m. we were all wet through. When we first set out our stay was to be only 4 days, at ½ past 9 I got home wet through everything. The *Topaz* saild from Storm Bay Passage this morn where she has laid two days through contrary winds. On arriving home I heard the following prisoners had deserted from Hobart Town.

the *Speedwell* schooner from Sydney commanded by McAlease land in the Bay.

8.11. 7 A.M. at 5 saild H.M. Ship *Porpus* for Sydney at home all the day—*male Vespere*. C.S., Simmons.

21.11. 7 A.M. at 7 saild the *Speedwell* schooner to Sydney commanded by Mr. McAlease. ½ past Sergt McCauley and one of the Patrole went on board the schooner. At home all the day. The Governor sent me some prayer books and bills to distribute to who I think proper. In the eve thunder at a distance. C.S., Chesterfield.

(27) Port Cygnet.

26.11. 7 A.M. at 8 I went in my boat to Sandy Bay and observd a vessel standing up the river, came home and killd some pigeons at 4 p.m. the *City of Edinborough* anchord in the Bay, last from Port Dalrymple and brought Mr. Harris from thence, she came from the Cape of Good Hope. C.S., Barkley.

28.11. 7 A.M. this morn I walkd to the farm and on my return I see the *Lady Nelson*, brig, coming into the bay at 2 she anchord and brought some settlers men and their wives and children. Commanded by Lieut. Kent. C.S., Berry.

2.12. 7 A.M. at home all the morning. at 5 p.m. Lieut. Kent H.M. ship *Lady Nelson*, Capt. Patterson of the *City of Edinborough* and Mr. Berry and Lieut Lord and Mr. Harris Mr. Fosbrook Mr. Janson and self dind at the Governors in his new house the first time that he dind there. C.S., Caledon.

6.12. 7 A.M. at 7 saild H.M. Brig *Lady Nelson*, Lt. Kent, for Sydney. . . . At 2 I went to Mr. Bowdens to take lunch afterwards Mr. Bowden and self went on board the ship *City of Edinborough* where we dind.

11.12. 7 At 6 arrivd the *Governor Hunter*, schooner, from Sydney with grain.

12.12. 7 A.M. at 10 I took a walk with Mr. Berry and Capt. Patterson to see his men cutting a fine mast, 68 feet and not a not!

28.12. 7 Saild the *City of Edinborough* for Sydney.

17. 1. 8 A.M. early this morning a gun was fird from a ship in Sandy Bay a boat was sent down with the pilot. H.M. Ship *Porpoise* arrivd from Norfolk Island with 180 settlers with thirty chl. for this Colony. at 10 she anchord in the bay at 11 performd divine service. at 2 p.m. several of the officers of the *Porpoise* calld upon me. C.S., Simmons.

24. 1. 8 Very early this morn one great gun was heard at a distance, and the Lt. Govnr sent the pilot down the river to Frederick Henry Bay. In the eve he returnd but could not see a ship. C.S., Arrival.

29. 1. 8 A.M. this morn early saild H.M. Ship *Porpoise* for Sydney. C.S., Porpoise.

2. 3. 8 The *Lady Nelson* arrivd from Norfolk with settlers. C.S., Stockport.

8. 3. 8 A.M. this morning saild the *Lady Nelson* and ship *Harrington* for Sydney.

28. 3. 8 at 4 p.m. the ship *Rhodes* Capt. Brooks arrivd from England with a valuable cargo for Mr. Cambel of Sydney.

8. 4. 8 This morn arrivd the *Perseverence* Capt. Faulkner from Sydney.

9. 4. 8 A.M. this morn saild the ship *Rose*, Capt. Brooks for Sydney.

16. 4. 8 A.M. this morn we heard that Hall and Lockley was drownd. At 5 p.m. arrived the *Estremina*, Mr. Apsey commander. C.S., Arrival.

21. 4. 8 A.M. this morn I went out afishing. At 5 the *Perseverance* went into mid channel. C.S., Scott.

22. 4. 8 A.M. early this morn saild the *Perseverance* for Sydney and Lt. Lord on board. C.S., "Sydney."

4. 5. 8 At 7 p.m. we heard 4 guns fird from a ship down the River.

5. 5. 8 After breakfast I waited upon the Lt. Govnr who informd me that the Captains name was Chase and the ship *Du Buck* last from Timor she has 300 ton of Sperm oil one year from England.

12. 5. 8 This morn the *Du Bucke* saild to Frederic Henry Bay.

28. 5. 8 This morn Mr. Humphry and Mr. Bowden calld upon me at 12 information that a brig was coming up the river, we had information that it was the *Eagle*, Brig, from India belonging to the House of Cambel and Hook supercargo, Capt. Webster.

5. 6. 8 At 11 performd divine service H.M. Schooner *Estremina* arrivd from Norfolk Island with settlers.

9. 6. 8 A.M. early this morn one man went duck hunting and 2 akangarooing they brought home one of 80 weight. We breakfasted and at 12 got into the boat as we came out of the Passage we see 2 vessels going up to Hobart Town. At 5 we landed

at Hagans Farm where we dind, and at 6 got into the boat arrived at Hobart Town ¾ past 7 arrivd the *Eliza* and *Governor Hunter*, schooners, from Sydney. C.S., Dorset.

12. 6. 8 A.M. at 11 performd divine service, this morn we heard the report of a gun down the River, at 2 p.m. we had information that Capt. Chase of the *Du Bucke* fird a gun to a ship which he saw at anchor off Cape Piller. Vessels laying in Sullivan Cove Hobart Town, the *Eagle*, brig, from Canton, the Colonial Vessel *Estremina* with settlers from Norfolk Island, the *Govnr. Hunter*, schooner, and *Eliza* with corn from Sydney. C.S., Ward.

13. 6. 8 A.M. in the morning I waited upon the Lt. Govnr who informd me that there was a ship in the Storm Bay at anchor . . . . the *Dundee* from Pulopenang Capt. Cumming at 9 saild H.M. Schooner *Estremina* for Sydney. C.S., Dundee.

16. 6. 8 At 12 saild the brig *Eagle* for Sydney the wind blowing very fresh at N.W. in the eve I smoke a pipe with Mr. Humphry/

17. 6. 8 Engagd all the morning upon the bench. Afterwards Mr. Humphry and self walkd to Sandy Bay to see the ship *Dundee* coming up. C.S., Longford.

29. 6. 8 A.M. at 10 the *Du Buke* came and anchord in the bay.

2. 7. 8 The *Du Buck* saild whaling after delivering her spirits into the Store.

6. 7. 8 At 10 the *Dundee* made the signal for sailing. About 7 p.m. saild the *Dundee*, Capt. Cumming for Sydney.

NOMENCLATURE.

20. 4. 4 A.M. Mr. Brown returnd to the Camp, and calld upon me. He had been with an intention to get to the River Ewen [28] but could not. He found another river [29] which ran due south from the camp. I dind with Mr. Lord.

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(28) The River Huon (named by D'Entrecasteaux, 1792). Knopwood was very careless as regards spelling, particularly so with names. The same river is referred to as the Houin and also the Huon in other parts of the diary.

5. 6. 4 . . . They were obliged to land at Sandy Bay.

9. 6. 4 A.M. at 9 Mr. Wilson breakfasted with me, and we both went to Prince of Wales Bay (30) opposite Risdon Cove, where I left him and did not get back till 5 p.m. to dinner. Capt. Bowen from Risdon, came on purpose to see me, but I was from home.

21.11. 4 At 3 we returnd having been up the River Huon where I see a beautiful Island which I gave the name Gardner's Island (31) in honor of Hon'ble. A. A. Gardner, Capt. of H.M. Ship *Hero*.

2.12. 4 A.M. at ½ past 10 performd divine service. I read at Church the General Order receivd from His Excellency the Commander in Chief of the division of the 2 counties and the settlement at Hobart Town, under the command of Lt. Gov. Collins, should be calld Buckinghamshire and the one under Lt. Col. Patterson should be calld Cornwall.

9. 1. 5 The Governor gave the name of the town at the farm New Town.

9. 4. 5 Sandy Bay mentioned.

8. 5. 5 Mr. Harris & Samon went down the River to Frederick Henry Bay to survey a piece of water there called Pittwater (32).

18. 2. 6 At 9 we got to Storm Bay Passage (33) ½ past 12 at Green Island the wind blowing very fresh, at 3 we were in the River Huon at 4 opposite Gardeners Island.

12. 3. 6 I got in my boat with my dogs and men and went up the river under Mount Dromedary.

14. 3. 6 At 5 we got into my boat and came down the River, breakfasted at the bottom of Mount Direction (34) At 12 made sail under Bedlam Walls where we anchord the boat and got some very fine fish.

9. 4. 6 Early this morn I went to Browns River.

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(30) Prince of Wales Bay, a name still in use. Must not be confused with Prince of Wales Bay on the East Coast, where Tasman's carpenter landed.

(31) Now Garden Island (Huon River).

(32) The Basin Ransonnet of Baudin's Charts.

(33) Storm Bay Passage—D'Entrecasteaux Channel.

(34) Mount Direction was named by Hayes.

24.11.	6	A.M. at 9 I went down the River to Ralphs Bay (35) and see the try works with Mr. Groves.
29. 5.	7	"near Faulkner's (36), distance from Hobart Town about 7½ miles.
30. 4.	8	New Norfolk the name of the place where all the Norfolk settlers reside.
18. 5.	8	Mr. Humphry and self went across the river and walkd to the Coal River 12 miles into the country. We got there about 6 made fire in the oven a place very large which will contain 100 men the enterence is small but it rises gradually and in the side is a hole where the smoke goes out. the night was very wet but we felt no inconvenience from it.
Constitution Hill (37) Breakneck Hill (37)		
20. 5.	8	At 10 we prepared to come home the day very wet arrivd Breakneck Hill about 1 p.m. when we stoppd and made a fire dressd some pork and at 5 p.m. we arrivd home.

ABORIGINES.

12. 2.1804		[At Frederick Henry Bay] . . . It appeard to me that the natives were much better supplied with fish and birds than those at Port Philip.
13. 2.	4	"17 of the natives were seen by the party; they reported the natives to be men well made, entirely naked, and some of them had war wepons. They had a small boy with them about 7 years old and did not appear to flee from them.
24. 2.	4	[At Sullivan Cove] Many fires of the natives around, but none came near to the camp.
29. 2.	4	. . . At 3 I walkd some distance, see many of the native huts, but none of them.
7. 3.	4	[Upper Derwent] . . . During our walk we a great many of the native hutts and they fires they made, no doubt they see us. In the eve the natives made a fire near where we slep, on the west side of the river.

(35) The "Double Bay" of the French. Named "Relph's Bay" by Hayes.

(36) Mount Faulkner apparently named after this early poineer, whose house was near Austin's Ferry.

(37) Constitution Hill and Breakneck Hill. These names are now used to designate hills in other localities.

9. 3. 4 A.M. at 8 many of the natives were about the camp, but not prevaild upon to enter. Capt. Merthow and Mr. Brown had an interview with them on the shore near the *Ocean.*

18. 4. 4 [At Frederick Henry Bay] . . . many of the natives were there.

3. 5. 4 [At Sullivan Cove] A.M. Took a long walk in the morn; at 2 p.m. we heard the report of cannon once from Risdon. The Lt. Governor sent a message to know the cause. At ½ past 7 Lt. Moore arrivd at the camp to Lt. Governor Collens, and I receivd the following note from Risdon:—

"Dear Sir,

I beg to referr you to Mr. Moore for the particulars of an attack the natives made on the camp to-day; and I have every reason to think it was premeditated, as their number farr exceeded any that we ever heard of. As you express a wish to be acquainted with some of the natives, if you will dine with me to-morrow you will oblige me by christening a fine native boy who I have. Unfortunately, poor boy his father and mother were both killd; he is about two years old. I have likewise the body of a man that was killed. If Mr. Bowden wishes to see him desected, I will be happy to see him with you to-morrow. I would have wrote to him, but Mr. Moore waits.

Your friend,

J. Mountgarret, Hobert (38), six o'clock.

The number of natives I think was not less than 5 or 6 hundred.—J.M."

At 8 Lt. Moore came to my marquee and stayd some time, he informd me of the natives being very numerous, and that they had wounded one of the settlers, Burke, and was going to burn his house down and ill treat his wife &c &c. C.S., Coventry.

4. 5. 4 A.M. neither myself or Mr. Bowden were able to get a boat to go to Risdon. Mr. Harris and Mr. Lord dind with me. C.S., Litchfield.

(38) Hobert: Bowen had called his settlement at Risdon Cove Hobart.

5. 5. 4 At 6 I went out with Mr. Lords doggs and kill a couple of kangaroos; at 20 minutes past 7 returnd home to breakfast with Mr. Lord; I dind with Mr. Lord. C.S., Newcastle.

6. 5. 4 a.m. At 10 the weather so wet that divine service could not be performd; at ½ past 11 a strange sail appeard coming up the river; at 1 p.m. anchord in the Bay the *Nancy* cutter from Port Jackson with despatches for Lt. Gov. Collens at ½ past 2 we observd the Risdon whale boat returning home; she had been out eight days with Gov. Bowen and Mr. Wilson. C.S., Nancy.

7. 5. 4 At 11 waited on the Lt. Governor respecting my garden by the house. At 3 p.m. Mr. Shipman measured the ground. C.S., Knutsford.

8. 5. 4 A.M. a very sharp frost, at 11 Capt. Bowen Mr. Wilson, and Lt. Moore came to the camp, the two first gentlemen dind with me and in the eve Mr. Moore came and stayd till quite late. C.S., Liverpool.

9. 5. 4 A.M. at 10 Mr. Mountgarret came to the camp and calld upon me. p.m. I took a walk with my gun. C.S., Stone House.

10. 5. 4 A.M. I stayd at home all the morn; at 11 Capt. Bowen, Mr. Mountgarret and Mr. Wilson came to the camp. Mr. M. and W. and self dind with Mr. Lord. Capt. Bowen slept at my marque. C.S., Mount Edgecombe.

11. 5. 4 At 11 a.m. Lt. Lord and self went to Risdon with Capt. Bowen. Mr. Lord returnd in the eve, and I stayd there. I xtianed a young native boy whose name was Robert Hobert May. C.S., Cawsand.

12. 5. 4 A.M. in the morn we took a walk to see where the natives attacked the camp and settlers. C.S., Saltram.

16. 5. 4 . . . At 3 p.m. Mr. Wilson, Capt. Bowen, Mr. Mountgarret came to the camp. They brought down the native boy for Lt. Governor Collins to see.

21. 6. 4 A.M. I breakfasted with Mr. Lord and Humphrys. At 5 p.m. Mr. Collins returnd in the white cutter from Betsys Island &c. He went to the River

Houin, and report it to be by far the most eligible situation for a settlement; the great supply of fresh water, good land, and trees, and the anchorage safe and good. He see many of the natives and was conducted to the town by some of them, where there were about 20 families. He stayd all night with them. They were all very friendly. He see three of their cattemerans, or small boats made of bark, that will hold about six of them. At 8 we heard the report of a gun, and likewise in the nigh; supposed a ship in Frederick Henry Bay. C.S., Somers.

2.11. 4 At 8 I went across the river with my boat and Mr. Groves with me. At 3 p.m. the Governor's boat returnd from Betseys Island and brought with them a native man. The man was much coverd with charcoal, and had a bag made of kangarro skins about his neck which contained teeth of one of the tribe. The same afternoon he was dressd in trousers and a shirt and jacket given him by the Governor. C.S., Dryden.

3.11. 4 This morn I heard that the native man deserted from Hobart Town. At 10 Mr. Fosbrook and Mr. Bowden with Capt. Rhodes returnd from their excursion; they had very good luck, killd and took 17 black swanns. At 5 p.m. the weather began to blow from the N.W. At 8 it blew very hard gales from the same quarter. C.S., Gay.

NOTES ON THE ABORIGINES.

16. 2.1805 At 8 the drum beat to arms. It was supposed that the corn sacks were set fire to by reason of the great fires. It was only the natives.

5. 3. 5 . . . at 3 came to anchor the schooner *Nancy* from Port Dalrymple. As she came past Oyster Bay she picked up three men who belonged to the *Sophia* that was sealing there. The natives had set fire to their house and robbed them of the provisions. Had not the *Nancy* come they must have perished. The natives destroyed about 2000 seal skins which they had taken since they were on the Island (39).

(39) Oyster Island was the name given at this time to Maria Island. Tasman named Maria Island in 1642.

9\. 4. 5 The country from Government Farm to Sandy Bay all on fire by the natives.

16\. 4. 5 Native fires for a great distance on the opposite shore.

2\. 5. 5 Went to Herdsmans Cove, many of the natives were all around, and the country on fire.

8\. 1. 6 Lt. Johnson's servant returnd from Brown's River and brought in a native girl.

10\. 1. 6 Early this morn the little native girl which was brought into Hobart town made her escape out of a window at Wiggins, a marine, with whom she lived.

12\. 1. 6 The country on fire on the N.E. side of the river and likewise by Millers and the Government Farm by the natives.

13\. 1. 6 At 3 p.m. the country on fire by the natives which makes it very hot.

22\. 2. 6 At 4 made sail through the Passage. When we got near the Western Bay [40] we see 2 catamarans with natives in them. They put back as soon as they see us. Their catamarans were made of bark.

1\. 8. 6 A.M. at 7 Lt. Lord and self went in the Govt. cutter to Capt. Bristow's ship in Storm Bay Passage. At 3 p.m. we got off again and Capt. Bristow came up with us. We see a great many of the natives both men and women. They were friendly. C.S., Worcester.

27.11. 6 A.M. this morn early my two men that were absent since Monday night returnd. They first went to North West Port in Storm Bay Passage, where they had bad success. From thence they went into Frederick Henry Bay where they had good success, but the natives took from them 9 kangaroos whilst they were hunting, and their boat which they found again in three days search. C.S., Hinkley.

23.12. 6 The country on fire all by Risdon for miles by the natives.

2\. 3. 7 . . . This afternoon my man Richardson came in from kangarooing and brought 80 wt. and

(40) N.W. Bay.

left Earl and Kemp in the bush. He informd me that on Saturday morning about 9 a.m. he and Earl were out with the dogs and that the natives to the number of 60 came down to them throwing stones and shaking their spears at them. One man came forward to Richardson and was going to spear him but he shot him. Another came up to Earl and he killd him. My man immediately made up the hill for fear the natives should surround them and kill them and the dogs. The two natives that my men shot the others took away and made a very large fire for the purpose of burning the dead.

The natives have been very troublesome for a long time but not so desperate as lately. No doubt but they have killd Brewer. The natives endeavour to keep the men and dogs in the valleys that they may throw stones on them which they do with great force and exactness. C.S., Rochester.

19. 4. 7 My man Richardson came home having been absent 19 days, He gave information that the natives had nearly killed him and the dogs. The Government people were out and fell in with them when a battle ensued and they killd one of the natives. The natives killd one of the dogs. It is very dangerous to be out alone for fear of them. They are so hardened that they do not mind being shot at. C.S., Wells.

8.10. 7 Went down to Brown's River. As we went down we see a great many natives, but we did not go on shore.

9.10. 7 At 11 we went to Brown's River for my man Earl whom I had left the day before and we saw a great many of the natives in the same place and on our return we landed amidst them. The women and children were together and the men out hunting. At 6 p.m. they returnd and they all came amidst us between 250 and 300. They were all very friendly and we gave them presents. . . . C.S., Upton.

11.10. 7 My man came down from kangarooing and informd me of the death of my dog Spot which was speard by the natives.

2. 2. 8 I took my boat and went across the water where I met my man he had been kangarooing. Brought home two men from the Lime Kilns they were driven away by the natives who had killd two of their dogs. C.S., Wallace.

HORTICULTURAL NOTES.

6.12.1804 Engaged in planting pot8oes.
11. 6. 5 This day I began to sow some wheat.
19. 9. 5 Prepared some ground for potatoes.
25. 9. 5 Employd in planting potatoes. 2 bushels for which I gave the enormous price of £3.10. per bushel.
29. 9. 5 Got all my rye stripped in by William Jones &c.
30. 9. 5 Engaged some people to clear me 4 acres of land near the house in addition.
4.11. 5 Employd in my garden about pumpkin bed.
9. 1. 6 This day the harvest begun at the Government Farm.
11. 1. 6 This morn I began to have my wheat cut. At 1 p.m. I walkd to the Government farm a very fine crop they have got.
7. 2. 6 This morn finished cutting my wheat and began threshing my seed wheat.
4. 3. 6 This eve I bought a pumpkin for which I gave 1/-.
26. 7. 6 Busy sowing wheat.
9. 8. 6 This morn I sowd some garden seeds from England peas and beans although the day very wet.
8. 9. 6 This morn I finishd sowing the wheat. 4 p.m. Sowd gooseberries and currants and planted potatoes.
20. 9. 6 The day very warm, put some long turkey cucumbers into the bed.
15.11. 6 The ground very much in want of rain, and grubs destroyd all our vegetables.
20.11. 6 The gardens and everything very greatly refreshed for the delightful rain.
21.11. 6 A.M. this morn engaged upon the bench. Afterwards came home and busy in my garden, many fine strawberries ripe and green peas.
11.12. 6 This day I had some very fine peas out of my garden. The first I dressed. Last year I was obliged to preserve all the seed of the peas. They do not produce good crops in general.

5. 1.	7	This day began wheat harvest at the Government Farm.
19. 1.	7	This day I began my wheat harvest.
3. 2.	7	Employd all day in getting out potatoes.
5. 2.	7	Busy in pegging out land for wheat.
18. 2.	7	The colony in very great distress for wheat which is £6 per bushel and Potatoes 15/- per lb.
24. 2.	7	Wheat not to be obtained for £6 per bushel, and Barley £5 per bushel.
3. 3.	7	At home all the day collecting some garden seeds.
21. 4.	7	At home all the morning busy in my garden preparing the ground for cabbage planting &c.
23. 6.	7	This day finished two beds of early potatoes.
15. 8.	7	Sowd radishes &c.
22. 8.	7	Workd all day planting potatoes.
29. 8.	7	Sowing beans and preparing for potatoes.
2. 9.	7	This morn I cut some asparagus. The first that has been cut in the Colony.
8. 9.	7	Finishd putting in all my potatoes. Planting cabbages, lettuces &c. in my garden.
10. 9.	7	Setting peas, beans, and transplanting cabbages. I cut a great quantity of asparagus.
11. 9.	7	This morn I sent to His Honour the L/Govnr. 21 heads of asparagus.
29.10.	7	At home in the morning sowing seeds from England.
31.12.	7	This morn I finishd cutting barley.
14. 1.	8	Employd all the morning in getting in my wheat. This day I cut a cucumber.
15. 1.	8	Employd in cutting my onions ready for the house.
22. 1.	8	Employd all the day in getting up potatoes.
5. 2.	8	Employd in collecting garden seeds.
8. 2.	8	This morning fird my wheat stubble.
12. 4.	8	Busy in sowing wheat.
6. 5.	8	This morn sowing peas and beans.
13. 5.	8	Busy in planting cabbages.

NOTES ON THE WEATHER.

12. 2.1804 [The Ship *Ocean* at anchor, Frederick Henry Bay.]

The wind W.N.W. Fresh breezes and cloudy

13. 2. 4 W.N.W. Strong breeze and heavy squalls of wind and rain.
14. 2. 4 W.N.W. Strong breeze and hazy weather.
15. 2. 4 A.M. variable winds inclining to calm. At 4 a breeze sprang up from the N.W., weighed and made all sail. At ½ past 6 anchord in Risdon Cove in 4 fathoms.

[Risdon Cove, Van Diemen's Land, February, 1804.]

16. 2. 4 The morn very fine.
18. 2. 4 At 6 a little rain. They have not had a good shower of rain for four months.
19. 2. 4 Strong breeze and small rain.

[Sullivan Cove, River Derwent, Van Diemen's Land.]

22. 2. 4 Clear weather and fine.
23. 2. 4 Very fine weather
24. 2. 4 Do. weather.
25. 2. 4 Do. weather.
27. 2. 4 Rain.
28. 2. 4 We had rain all night.
1. 3. 4 Very fine weather.
3. 3. 4 In the eve fresh breeze.
8. 3. 4 At 5 raining with hard squalls.
10. 3. 4 Moderate and fair.
13. 3. 4 At 3 it blew a perfect gale of wind which continued some time.
17. 3. 4 Very fine weather.
30. 3. 4 (Good Friday) At 10 p.m. it blew very hard which continued all night.
31. 3. 4 Dark weather, blowing hard.
2. 4. 4 Strong breeze and squalls. Weather from the S.W.
6. 4. 4 Weather bad. We see a very great whirlwind in the river. At 9 much lightning in the eve.
7. 4. 4 The wind very much from the S.W.
8. 4. 4 The weather was very bad that no duty could be performd. Continual rain and wind all day and night.
22. 4. 4 At 10 the weather being bad could not perform duty at the camp.
1. 5. 4 Continual rain all the morn.
6. 5. 4 The weather wet.
8. 5. 4 A very sharp frost.
19. 5. 4 Continual rain and cloudy.
20. 5. 4 . . . Thermomiter 62 at ½ past 12.
3. 6. 4 The weather bad.

5. 6.	4	The afternoon and night blowing very hard from the S.W.
6. 6.	4	A very fine day.
10. 6.	4	The weather bad.
12. 6.	4	Very strong breeze.
13. 6.	4	Very heavy gusts of wind with hard rain at intervals.
14. 6.	4	Continual bad weather.
15. 6.	4	Moderate weather.
16. 6.	4	At 4 stormy weather and rain. At 8 more moderate.
22. 6.	4	Continual rain all this morn.
23. 6.	4	Moderate.
2. 7.	4	Continual rain.
3. 7.	4	Moderate and clear weather.
6. 7.	4	Moderate weather in the eve much rain.
8. 7.	4	Cold, and wind blowing.
12. 7.	4	Very bad weather.
13. 7.	4	Do. wr.
15. 7.	4	Weather very cold.
19. 7.	4	At 5 it began to rain. At 8 fine weather, but the mountain covered with snow. At 10 rain which increased. At 1 p.m. it blew a hard gale, the wind from the S.E. All the hills covered with snow around. a very bad night of wind.
21. 7.	4	Moderate. Rain at intervals.
22. 7.	4	The weather exceedingly cold and the mountain covered with snow, particularly the Table Mountain.
23. 7.	4	The hills covered with snow.
28. 7.	4	Much lightening with rain.
29. 7.	4	The weather bad, blowing hard. 1 p.m. a perfect gale of wind.
30. 7.	4	The wind blowing very fresh, a quantity of snow upon the mountain.
26. 8.	4	Severe gales of wind with hard rain. At 8 more moderate.
27. 8.	4	More moderate, but hot winds from the N.W. Very hard gales of wind.
28. 8.	4	Very hard gales during the night and morn.
2. 9.	4	Moderate and clear weather. At 4 rain.
3. 9.	4	A very fine morning.
5. 9.	4	Rain and snow.
8. 9.	4	This morn the weather remarkably fine.
9. 9.	4	9 a.m. very fine weather.
10. 9.	4	Strong wind with rain.

11. 9.	4	Moderate weather and fine.
12. 9.	4	The day very hot, but the Table Mountain (41) covered with snow.
16. 9.	4	The weather very wet. At 4 p.m. thunder was heard very loud and the Table Mountain was covered with snow.
17. 9.	4	In the eve continual rain.
18. 9.	4	Fresh breeze and clear. At 2 p.m. thunder.
19. 9.	4	At 3 very bad weather. At 6 the wind and rain very much. At 8 the mountain was coverd with snow.
21. 9.	4	The day very hot from the North West winds.
22. 9.	4	The day very hot. At 3 p.m. rain and hard thunder.
23. 9.	4	Rain at 10.
24. 9.	4	The day very hot and large flies began to be very troublesome.
30. 9.	4	Very windy.
1.10.	4	At 1 it blew a perfect hurricane. Many trees and the store tent upon Hunters Island was blown down. At 10 the weather began to moderate.
3.10.	4	The day remarkably fine.
10.10.	4	The day very hot.
11.10.	4	At 10 very squally with rain.
12.10.	4	A very fine morn. At 1 p.m. the sea breeze came.
14.10.	4	The day very warm.
15.10.	4	At 6 very hard rain which continued all night.
18.10.	4	Wind.
20.10.	4	The morn very hot. At 4 p.m. rain which continued some time. At 9 observd a very fine night rainbow from the S.S.W which continued some time, when we hed the rain very much from the mountain.
21.10.	4	At 10 rain accompanied with thunder and lightening. At 12 the weather very fine. P.M. very cold and excessive hard gales of wind which continued all night.
22.10.	4	Rain. Very violent squalls of wind and hard rain.
28.10.	4	Cold rainy weather.
29.10.	4	Strong winds.

3.11.	4	5 p.m. the weather began to blow from the N.W. At 8 it blew very hard gales from the same quarter.
4.11.	4	Very severe gales of wind. Wind N.W.
5.11.	4	It raind very hard. The weather very bad with rain and wind.
6.11.	4	The weather very windy.
8.11.	4	At 12 we had severe lightning.
9.11.	4	At one a very dreadful tempest of thunder and lightning. 2 it raind very hard which continued some time. At 4 a hot wind from the N.W.
17.11.	4	The day very wet.
18.11.	4	Hard gales and squally.
19.11.	4	Moderate.
3.12.	4	The first fine day we have had for some time.
4.12.	4	The day very hot.
10.12.	4	At 8 a very hot wind came up from the N.E which continued till 1 p.m. We then heard thunder at a distance. At 2 it began to rain very delightful showers. At 5 thunder very much.
16.12.	4	Wr. bad. in the eve some rain.
17.12.	4	The day very hot.
19.12.	4	The day very hot.
20.12.	4	The day exceedingly hot.
22.12.	4	The morn very damp but not much rain. The afternoon wet.
23.12.	4	The morn damp. At 5 p.m. a strong breeze came on.
24.12.	4	The morn very wet.
26.12.	4	The weather very cold at intervals.
30.12.	4	4 p.m. thunder with some rain.
6. 1.1805		Them: at 12 87½.
9. 1.	5	At 8 Thunder and lightning with rain.
10. 1.	5	A.M. Very windy. Rain at intervals: Eve very cold.
11. 1.	5	Very hot N.W. wind.
16. 1.	5	Rain with thunder and very hot.
18. 1.	5	Them, 82 in shade.
19. 1.	5	8 a.m. Fine wind N. Them 79½. 12 noon showery Wind N.E. Them. 75. 4 p.m. Fair, wind N. Them 86. 5 p.m. Wind N. Them 92. 8 p.m. wind N. Them. 62.
20. 1.	5	A.M. very windy, Rain at p.m.
21. 1.	5	A.M. weather fair and hot.
23. 1.	5	Continual rain all eve and night.

24. 1.	5	Very cold, rain at 5 p.m.
25. 1.	5	Rain.
26. 1.	5	Rain until 9 a.m.
27. 1.	5	Cloudy.
28. 1.	5	Weather moderate.
29. 1.	5	A.M. weather moderate.
30. 1.	5	A.M. Damp. P.M. Rain and little wind.
2. 2.	5	Moderate.
3. 2.	5	A.M. very hot.
4. 2.	5	A.M. hot.
12. 2.	5	"The hottest day we have experienced this season."
20. 2.	5	Frequent showers.
21. 2.	5	Moderate and fair.
23. 2.	5	Very hot. N.W. wind.
24. 2.	5	Very hot. N.W. wind.
28. 2.	5	Very fine.
3. 3.	5	Rain.
5. 3.	5	Moderate.
8. 3.	5	Hot. N.W. Wind.
9. 3.	5	Windy.
10. 3.	5	A.M. Rain. P.M. moderate.
11. 3.	5	A.M. moderate rain.
22. 3.	5	Very warm weather.
27. 3.	5	11 p.m. windy.
28. 3.	5	A.M. at 1 it blew a very hard gale of wind which continued until 6 at 8 more moderate. P.M. at 4 moderate rain.
30. 3.	5	A.M. at ½ past 11 this morn at 2 p.m. but more particularly at 2 Mr. G. . . . s thought he felt his house shake similar to an earthquake.
31. 3.	5	Very rainy at intervals.
8. 4.	5	"I went to the farm, and everything at a stand for want of rain, the grass parched up and all over gardens."
9. 4.	5	"Farm to Sandy Bay all on fire by the natives."
12. 4.	5	(Good Friday) The day remarkably fine.
14. 4.	5	(Easter Day) The day very fine.
17. 4.	5	Very windy.
2. 5.	5	Rain.
5. 5.	5	(Sunday) "Weather so damp that divine service could not be performd."
9. 5.	5	Rain all day.
10. 5.	5	Dark cloudy weather.
13. 5.	5	At 11 a hard breeze, at 4 it blew very hard, at night a gale.

14. 5.	5	Moderate.
16. 5.	5	Rain.
19. 5.	5	(Sunday) A.M. the winter being now on and the ground being so damp that divine service could not be performd. P.M. the afternoon very fine.
21. 5.	5	Weather remarkably fine.
22. 5.	5	Much wind this morning.
23. 5.	5	At noon began to blow. At 7 much lightening and a hard gale and heavy rain. 11 Blowing very hard from S.W.
25. 5.	5	More rain.
26. 5.	5	(Sunday) Fine weather but cold. Divine service could not be performd.
2. 6.	5	A.M. moderate, but cold and very damp.
8. 6.	5	The weather fine.
16. 6.	5	The weather cold.
20. 6.	5	Rain.
21. 6.	5	Continued rain all the morn. P.M. damp and very cold Wind S. 8 p.m.
22. 6.	5	The mountain covered with snow.
23. 6.	5	Cold and wet.
26. 6.	5	Wet.
30. 6.	5	Fine, but damp after the quantity of rain.
5. 7.	5	"The morn very beautiful".
6. 7.	5	A very severe frost.
7. 7.	5	Severe frost.
8. 7.	5	Very cold, 3 Rain. At 4 thunder.
10. 7.	5	Mountain covered with snow. Blowing hard S.W.
11. 7.	5	"Blowing hard with snow from S.W. The eve we had an eclipse of the moon."
16. 7.	5	Windy fresh N.W.
18. 7.	5	Rain. Wind fresh S.W.
19. 7.	5	"It is remarkable that bronzewing pigeons have not left us this winter which shows it is not so severe as last."
21. 7.	5	Fine but cold. Mountain covered with snow.
22. 7.	5	Very cold.
23. 7.	5	Cold, a little rain.
25. 7.	5	A sharp frost.
1. 8.	5	A sharp frost.
4. 8.	5	Rain all day. Much snow on mountain.
5. 8.	5	A very fine morn. Mountain covered with snow.
7. 8.	5	The day very cold.
8. 8.	5	Rain. Gale from S.W.
9. 8.	5	Strong S.W. wind.

10. 8.	5	A.W. windy. P.M. moderate.
11. 8.	5	Very fine. Mountain covered with snow.
12. 8.	5	The day remarkably fine.
13. 8.	5	A.M. very fine. At 4 p.m. it began to rain.
14. 8.	5	Continued rain.
15. 8.	5	Damp and cold. Rain at intervals.
16. 8.	5	P.M. at 8 some lightning from N.W. At 10 it began to blow. Continued until 12.
17. 8.	5	Rain and wind, mountain covered with snow.
18. 8.	5	Blowing very hard. This day was the severest that we had had since we have been upon the colony. The wind was a continual gale from the N.W. It blew down many trees and unroofed houses.
19. 8.	5	The gale continued all the morn blowing from S.W. At 9 much lightning.
20. 8.	5	A.M. Rain.
21. 8.	5	The day very fine after the wet and gale from the S.W. The weather is very cold.
31. 8.	5	A.M. Rain. Wind S.E. mountain covered with snow.
1. 9.	5	Weather very fine, but exceedingly damp.
2. 9.	5	The day very fine.
5. 9.	5	At 3 some rain, snow on mount.
6. 9.	5	The day very fine.
7. 9.	5	The day very fine.
8. 9.	5	The morn very fine.
11. 9.	5	The day very fine.
13. 9.	5	Fine showers.
15. 9.	5	Fine.
16. 9.	5	The day fine.
17. 9.	5	A gale of wind from S.E.
18. 9.	5	Very cold.
22. 9.	5	A.M. the morn fine. At 4 p.m. began to rain, but was finished by evening. At 8 began to rain which continued all night.
23. 9.	5	Rain.
24. 9.	5	Fine.
6.10.	5	Rain all day.
7.10.	5	Very wet and damp.
8.10.	5	Very windy.
10.10.	5	Very fresh S.W. wind.
13.10.	5	Fine but damp after incessant rain.
19.10.	5	A strong breeze.
20.10.	5	Cold sea breeze.
21.10.	5	Sea breeze.

22.10.	5	"The sea breeze generally sets in soon after 1 p.m."
24.10.	5	Sea breeze.
25.10.	5	Wind very high from S.E. and E. and very cold. At 7 rain which continued all night.
26.10.	5	Raining hard. Sea Breeze.
27.10.	5	Morn very fine after the great fall of rain. Afternoon sea breeze.
28.10.	5	Sea breeze.
29.10.	5	Very cold. Wind strong. Sea breeze.
30.10.	5	Very strong sea breeze.
1.11.	5	The morning cold and strong sea breeze which has been regular for some days.
2.11.	5	A.M. the day very cold. Sea Breeze.
3.11.	5	Strong sea breeze.
4.11.	5	A.M. at 9 a strong land breeze and a warm wind which continued all the day.
15.11.	5	At 8 p.m. it began lightning. At 10 it was a severe tempest which continued all night with rain at intervals.
16.11.	5	The wind blowing very hard from the South West, and cold.
17.11.	5	Wind S.W., at 10 p.m. we had heavy rain.
19.11.	5	The day very windy, from the S.E. continual rain all day.
20.11.	5	The wind blowing hard.
2.12.	5	A.M. at 7 the wind blowing very hard. At 2 we had a severe gale which continued some time.
7.12.	5	Blowing very hard all day.
9.12.	5	This day very warm, and land wind. N.
23.12.	5	A very strong sea breeze with heavy rain from S.E.
24.12.	5	Very cold for the season and a quantity of rain from S.E. with hail.
26.12.	5	Hard Breeze.
14. 1.	6	Hard S.W. breeze with some rain in the afternoon.
15. 1.	6	The wind continued all this day with thunder and lightning. At 3 p.m. rain.
18. 1.	6	The day very cold and wet.
20. 1.	6	A.M. at 8 snow upon the mountain. The day cold and wet.
2. 2.	6	The day very hot. At 8 much lightning and severe tempest which continued until 11.
5. 2.	6	This day very hot.

8. 2.	6	A.M. the morn very hot. 2 p.m. it began to thunder from the west. ½ past 3 heavy thunder with moderate rain. 7 it began lightning. ½ past 8 it increased very much. At 9 the lightning was most severe we ever had had on the Colony, and the thunder the most awful. The rain continued from 9 till 12.
9. 2.	6	The tempest continued at a distance. It went to the N. and S, The air was cool and the ground much refreshed after the great drought.
10. 2.	6	A.M. early this morn more rain.
16. 2.	6	1 p.m. very strong N.W. wind, and exceedingly hot.
18. 2.	6	Fresh breeze.
19. 2.	6	A strong breeze.
24. 2.	6	All the day exceedingly hot.
27. 2.	6	The ground being so hard without rain. . .
28. 2.	6	Strong breeze.
1. 3.	6	The day very hot. From the N. wind blowing all day very hard.
2. 3.	6	A.M. the morn very wet. Sharp frost this eve.
5. 3.	6	Small quantity of rain.
6. 3.	6	The day very fine.
9. 3.	6	Rain. A.M. at 9 rain. 11 do. wr. Divine service could not be performd. Everything is burnt up for want of rain.
18. 3.	6	At 10 it began to rain which was greatly wanted. 12, very fine rain. continued all the evening. 9 p.m. one remarkable loud clap of thunder and the lightning before it was the longest I ever knew.
31. 3.	6	A great quantity of rain.
3. 4.	6	A.M. the wind blowing hard from the South and rain at intervals.
7. 4.	6	A.M. the morn wet.
15. 4.	6	The day wet and blowing fresh from S.E.
16. 4.	6	At 4 it began to blow and rain which continued with thunder and lightning.
18. 4.	6	A.M. the morn very fine.
21. 4.	6	In the eve a great quantity of rain.
22. 4.	6	Rain in the evening.
23. 4.	6	A quantity of rain fell.
24. 4.	6	A.M. rain and the day very hot.
25. 4.	6	Rain and heat.
28. 4.	6	The day very cold.

29. 4.	6	A.M. at 7 very cold and a little snow. The mountain had much upon it 9 blowing very fresh from the South West. ½ past 2 p.m. the mountain was covered with snow. At 8 the night very cold.
30. 4.	6	A.M. early this morn blowing hard from the N.W. At 8 the mountain coverd with snow. The day very cold and strong N.W. wind.
1. 5.	6	A.M. the day very cold with slight snow at 9 blowing very fresh from N.W. In the eve blowing very hard with much snow.
2. 5.	6	Blowing very fresh this morn from the N.W. 3 p.m. more moderate. at 5 rain with much snow.
3. 5.	6	A.M. the day very cold and blowing hard from the S.W. at intervals.
4. 5.	6	The morn very wet.
5. 5.	6	The day blowing very hard and snow at intervals.
7. 5.	6	This morn very fine after the gale which we have had for some days.
8. 5.	6	The day very fine.
10. 5.	6	Morning fine. 4 p.m. rain, at 8 lightning from the West.
11. 5.	6	The morn very rainy. At 8 much lightning. 12 the day very cold.
13. 5.	6	The morn wet.
20. 5.	6	The day very fine. A sharp frost in the morning.
22. 5.	6	The day very fine.
23. 5.	6	The day very fine.
27. 5.	6	A.M. at 5 rain, at 11 clear.
29. 5.	6	A sharp frost this morning.
31. 5.	6	The day very fine. In the eve much lightning.
1. 6.	6	The morn very cold.
3. 6.	6	The day very fine.
4. 6.	6	The day was remarkably fine.
8. 6.	6	A very cold day.
11. 6.	6	A.M. this morn we had the severest frost we have experienced in this country.
13. 6.	6	This day very fine.
17. 6.	6	This morning much rain and blowing strong from the South. At 11 a gale of wind from the S.W.
18. 6.	6	A.M. this morn blowing very hard with rain.
20. 6.	6	Very cold in eve.
21. 6.	6	The weather very cold and a sharp frost.
22. 6.	6	The day very cold.
24. 6.	6	The day very fine, but very cold.

26. 6.	6	Very fine weather, but cold.
28. 6.	6	In the eve, much rain.
3. 7.	6	A great quantity of rain fell.
4. 7.	6	The day fine.
5. 7.	6	The day very wet and many whales opposite the house.
6. 7.	6	The day very fine, but cold.
9. 7.	6	This morning a very severe frost.
27. 7.	6	This morn much rain and very cold. At 10 snow.
28. 7.	6	The mountain covered with snow.
29. 7.	6	The day very cold.
4. 8.	6	The morn very cold, at 3 much rain and continued all night.
7. 8.	6	Very wet.
8. 8.	6	Wet.
9. 8.	6	Very wet.
18. 8.	6	The day very wet.
19. 8.	6	Raining and squally. In the eve much lightning.
20. 8.	6	The day very hot and blowing hard. In the eve much lightning.
22. 8.	6	The day very fine, but cold. Ceremony of thanksgiving performd for the glorious success which attended H.M. arms over the combined fleet of the enemy off Cape Trafalgar on the 21st day of October last.
25. 8.	6	A.M. the day very fine
26. 8.	6	The day very fine.
29. 8.	6	The day very fine
6. 9.	6	Blowing fresh. 7 p.m. rain, the day very fine. Sea breeze.
12. 9.	6	The mountain covered with snow.
14. 9.	6	The day very fine.
20. 9.	6	½ past 2 lightning and thunder with a little rain. The day very warm.
21. 9.	6	Much rain all the afternoon and evening.
22. 9.	6	The day very fine.
23. 9.	6	7 p.m. blowing very hard.
29. 9.	6	Rain in evening.
30. 9.	6	At 8 blowing hard from the North, the morn very cold after the rain
5.10.	6	The morn very cold, blowing hard from the west.
5.10.	6	A.M. The wind continued all night. At 1 p.m. blowing a very heavy gale from the West.
10.10.	6	In the eve we had a fine shower.

19.10.	6	The day exceedingly hot. Blowing hard from the N. a very hot wind. At 7 p.m. lightning and at 9 rain.
20.10.	6	In the eve at ½ past 9 lightning.
21.10.	6	At 8 blowing very fresh from the N. In the eve lightning.
23.10.	6	A.M. the morn cold.
6.11.	6	The weather very dry for want of rain
8.11.	6	The weather very dry. No grass for want of rain.
13.11.	6	Rain very much wanted.
15.11.	6	The ground very much in want of rain and the grubs destroying all our vegetables.
17.11.	6	Thermometer at 12, 78. At 4 p.m. 98½.
18.11	6	A.m. early this morn we had a very fine shower of rain at 9. The earth very much refreshed with it. 3 p.m. very fine moderate rain. We must truly bless God for the rain which has destroyed thousands of grubs. All our gardens and the corn was very much destroyed by them.
19.11.	6	Afternoon rainy weather.
20.11.	6	The morn very dark and cloudy with showers. P.m. the gardens and everything very much refreshed with the delightful rain
23.11.	6	Very hot
24.11.	6	The wind very strong from the South.
25.11.	6	A.M. this morn blowing fresh from the South.
26.11.	6	A.M. this morn we had a very fine shower of rain. At 12 do. wr. which continued all the aft. till 5 p.m.
28.11.	6	The aft. very stormy with rain and wind blowing very hard from the West.
30.11.	6	The morn very cold and blowing exceedingly hard gales from the W.N.W.
5.12.	6	The day remarkably cold. Blowing very hard from the west. 5 p.m. snow upon the mountain. At 9 lightning from the East.
7.12.	6	The morn very cold. At 10 rain.
10.12.	6	At 7 p.m. the eclipse very visible and spoke of in Moore's almanac.
11.12.	6	1. Blowing fresh from the S.W. at 11 the wind changed to the South. Sea Breeze.
12.12.	6	The mountain was covered with snow. Blowing very fresh from the South West.
13.12.	6	Cold.
15.12.	6	2 p.m. a very fine shower of rain.

20.12.	6	The day cold. The wind blowing hard from the West.
21.12.	6	Strong west wind all the day. The longest day.
22.12.	6	The wind blowing a strong sea breeze.
23.12.	6	The day very warm
24.12.	6	The day very hot. At ½ past 3 p.m. thermometer 102.
25.12.	6	Christmas Day. The day was very hot. At 3 p.m. the thermometer standing at 105 in the shade. The heat was so great that it bent the glass of the thermometer and broke it.
26.12.	6	The morning very hot. The country all on fire.
27.12.	6	The morn much cooler. The country all on fire up to Herdsman's Cove and likewise on this side of the river.
28.12.	6	The morn very warm
30.12.	6	The wind blowing very hard from the W.N.W.
31.12.	6	The country very much on fire to the westward, and it approached up the mountain.
1. 1.	7	At 10 the morn cold. In the eve a little rain.
6. 1.	7	At 8 it began to rain. At ½ past 10 a very fine shower and very dark.
7. 1.	7	The morning fine after the rain.
19. 1.	7	The morn very warm.
20. 1.	7	6 p.m. we had a moderate shower of rain.
21. 1.	7	This eve we had a little rain.
22. 1.	7	5 p.m. we had thunder at a distance.
24. 1.	7	At 11 we had thunder at a distance.
17. 2.	7	The day very hot.
18. 1.	7	A.M. this morn very hot. Scarce able to stir out. We have not had any rain for a very long time. No grass and the country on fire by the natives. A strong sea breeze.
19. 1.	7	A strong sea breeze.
20. 1.	7	The weather very hot. We had a very small shower of rain this eve. Sea breeze strong.
21. 1.	7	A strong sea breeze.
27. 1.	7	The day very windy.
1. 3.	7	We had a little rain.
15. 3.	7	A fine shower of rain which we have not had for five months.
26. 3.	7	We had a fine shower of rain which we have not had for these 5 months.
3. 4.	7	In the morn early the mountain was covered with snow.
4. 4.	7	A.M. the wind blowing hard.

9. 4.	7	5 p.m. much lightning. At 11 the wind increased very much and continued all night.
10. 4.	7	A.M. the wind blowing very hard all the morn.
20. 4.	7	The eve very cold.
21. 4.	7	At 9 the weather very cold, blowing hard from the N.W. with rain at 3 p.m. thunder from the N.W. It rained in the eve.
22. 4.	7	In the eve, wind blowing hard.
23. 4.	7	A.M. blowing a gale of wind this morn. The barn which Nicholls valued at Capt. Sladen's at £350 was blown down.
24. 4.	7	The day very cold.
25. 4.	7	The morning very cold.
26. 4.	7	The morn very cold and blowing hard from the N.W.
27. 4.	7	This day blowing a gale of wind
28. 4.	7	A.M. the weather very fine after the gale.
29. 4.	7	The morn very fine after the rain.
30. 4.	7	1 p.m. very fine rain.
3. 5.	7	Weather uncertain
5. 5.	7	½ past 8 rain
16. 5.	7	The night very cold.
17. 5.	7	The day very cold and the mountain covered with snow.
22. 5.	7	The day very wet.
24. 5.	7	The mountain covered with snow, and a severe frost this morning
29. 5.	7	The eve very wet and blowing hard
30. 5.	7	Blowing very hard
3. 6.	7	The weather very cold
4. 6.	7	This morning a very severe frost. The ground I never see so white before.
5. 6.	7	The day very cold and evening very cold.
6. 6.	7	A.M. the morning a severe frost.
7. 6.	7	A.M. the morn very fine.
10. 6.	7	The morning very fine but cold.
11. 6.	7	The weather very cold
12. 6.	7	The morn very fine
17. 6.	7	The weather very cold
19. 6.	7	Very cold and severe frost
21. 6.	7	The weather very cold
22. 6.	7	This morn a very severe frost
23. 6.	7	The eve a very severe gale from the South West.
24. 6.	7	A.M. blowing very hard
25. 6.	7	The weather very cold.
28. 6.	7	The day very cold

8. 7.	7	The weather very fine
9. 7.	7	The weather very fine
11. 7.	7	The day very fine
12. 7.	7	We had some rain
15. 7.	7	A.M. the morn very foggy. 11 it cleared.
16. 7.	7	Very fine day
17. 7.	7	In the eve we had some rain
18. 7.	7	Rainy.
19. 7.	7	A.M. fine after the rain. In the afternoon much rain.
20. 7.	7	A.M. the day very wet and cold. In the eve snow.
21. 7.	7	A.M. at 9 we had more snow than I ever see. The mountain and the hills near the town were covered with it. At 12 it began to rain which continued until 9 p.m. Then it blew a gale from the South West. A very bad night of rain and wind and lightening.
22. 7.	7	A.M. in the morn early, severe gale of wind from the South West A very great quantity of rain and snow all the morn. At 11 the hills were all covered with snow. This day we had more snow upon the hills than has been seen on the ground. The day very cold and in the eve a severe gale of wind.
23. 7.	7	A.M. the morn cold and blowing a gale.
24. 7.	7	At 9 p.m. blowing a severe gale of wind and rain
25. 7.	7	A.M. the morning blowing hard with rain till 8 when it began to clear up.
31. 7.	7	A.M. at 8 the morn very clear.
2. 8.	7	The morning remarkably fine.
13. 8.	7	The day very cold and a very great quantity of snow fell.
14. 8.	7	A.M. this morning the ground so covered with snow and all the hills round the town. Thermometer 31.
15. 8.	7	the day very fine
22. 8.	7	the day very fine
23. 8.	7	the day very fine
24. 8.	7	all the afternoon and eve wet.
9. 9.	7	A very strong wind from the N.W. at 9 blowing a gale from the same quarter.
10. 9.	7	a.m. very fine after the gale
17. 9.	7	Blowing hard, the equinoxial gales continuing.
19. 9.	7	Blowing very hard.

20. 9.	7	A severe gale from the North West.
24. 9.	7	The day very windy
2.10.	7	At 10 a sea breeze set in.
3.10.	7	Strong sea breeze.
4.10.	7	Sea Breeze.
6.10.	7	A strong sea breeze.
11.10.	7	A.M. this day blowing hard, a strong land breeze.
12.10.	7	Blowing very hard all the day from the North.
13.10.	7	A strong wind from the North.
14.10.	7	The day very windy.
15.10.	7	In the afternoon a gale came on. At 9 blowing a gale of wind from the N.N.W.
16.10.	7	A.M. this morning the mountain was covered with snow. Rain with a gale of wind.
18.10.	7	A Sea Breeze.
19.10.	7	A gale of wind from the N.W. At 9 rain which continued all night.
20.10.	7	In the morning at 10 very moderate and clear after the gale, but a very great quantity of snow on the mountain.
27.10.	7	The weather bad.
2.11.	7	Blowing hard.
5.11.	7	Raining from 6 a.m. to 10 p.m.
3.12.	7	Between 2 and 3 p.m. we had a great deal of thunder and lightning, and the most severe gale of wind from the N W. since we have been in the settlement.
4.12.	7	The day very squally.
14.12.	7	Strong gales of wind all the night.
15.12.	7	A very strong gale of wind. At 4 the mountain was covered with snow, and the eve very cold.
16.12.	7	A.M. at 8 a very strong gale of wind from the N.W. and such weather that we have not been accustomed to at this season of the year. The mountain this morn was covered with snow.
20.12.	7	The day very hot.
21.12.	7	The morning very hot with a north wind blowing fresh.
22.12.	7	A day of continual rain.
29.12.	7	The weather very fine.
1. 1.	8	The morning very hot.
5. 1.	8	The day very wet.
8. 1.	8	The day very hot. 20 past 3 the thermometer 99. In the eve the wind changed from North to South when we had rain.
14. 1.	8	The morn very warm

15. 1.	8	The day very hot
16. 1.	8	The morn very hot with a North wind. At 11 so hot that it was not possible to stir out. The country all on fire and all round the town. 20 minutes past 3 p.m. a strong sea breeze set in from the South East.
8. 2.	8	The aft. very wet.
10. 2.	8	The weather blowing hard.
11. 2.	8	The weather blowing hard.
12. 2.	8	Blowing very hard.
14. 2.	8	Blowing wr.
23. 2.	8	Windy.
24. 2.	8	All the day blowing hard from the South
26. 2.	8	The morning very hot.
3. 3.	8	This eve we had some rain.
8. 3.	8	In the eve some rain
10. 3.	8	The day very wet.
15. 3.	8	The day very fine
20. 3.	8	We had some thunder this afternoon, but at a distance
22. 3.	8	In the aft we had a severe tempest of thunder and lightning
23. 3.	8	The morn very fine with general rain
27. 3.	8	The day very fine.
1. 4.	8	The mountain was covered with snow this morning.
28. 4.	8	The day very cold and rain.
29. 4.	8	Some rain.
2. 5.	8	Cold at night
3. 5.	8	Wet at night
6. 5.	8	The mountain covered with snow.
8. 5.	8	The morning fine
12. 5.	8	This day we had a great quantity of rain
13. 5.	8	The wind blowing very fresh
15. 5.	8	The day fine but cold
18. 5.	8	The night very wet
24. 5.	8	The weather very cold and stormy, and the night very bad.
25. 5.	8	The day very stormy
2. 6.	8	The morning very fine
10. 6.	8	The night very bad with snow
11. 6.	8	The day very cold and the mountain covered with snow
16. 6.		The wind blowing fresh N.W.

18. 6.	8	The morning very cold and a great quantity of rain and snow There was more snow on the mountain than ever I see before. The wind blowing hard from the S.W.
19. 6.	8	The morning very cold
23. 6.	8	The eve very cold
28. 6.	8	The day very fine
30. 6.	8	A very sharp frost this morning
3. 7.	8	The morning very wet and cold
4. 7.	8	In the eve lightning. It was a general observation that in the winter season scarce a night passes, but we have lightning.
5. 7.	8	In the eve lightning from the N.W.
6. 7.	8	In the eve lightning from the N.W.
10. 7.	8	The morning very cold
17. 7.	8	The day being very cold divine service could not be performd.

STUDIES IN TASMANIAN CETACEA.

Part VI.

By

H. H. Scott, Curator of the Queen Victoria Museum, Launceston,

and

Clive Lord, F.L.S., Director of the Tasmanian Museum, Hobart.

(Read 17th November, 1927.)

ZIPHIUS CAVIROSTRIS (or sp.).

On the third of October, of the present year, there came to us from Preservation Island the ossified mesorostral bones of a Ziphoid Whale.

Owing to the dense character of such ossified rostral moieties it is not easy to determine their actual age, unless field notes have been collected, and as none are available to use, we can only say that, although apparently recent, it may have been washed out of a Pleistocene shell limestone formation.

The specimen is not perfect, and has at its proximal end a complete cast of the anterior narial wall, a cavity 60 mm. wide x 40 mm. deep. Its distal end yields evidence of a wound during the life of the animal, which must have caused distortion to the end of the beak. Due also to this, the tip of the right intermaxillary bone is twisted upwards, so that the floor of the dental fossa is on the level of the middle of its fellow.

ASYMMETRY.

The asymmetrical development, at the proximal end, is all towards the left, and is considerable in the actual weight

of bony matter present. This, of course, is the normal asymmetry of such a whale, and has nothing to do with the mutilated, pathogenic effect, at the distal end.

SIZE.

Sir William Turner (1) quoted two specimens in sizes of 13½ inches and 14¾ inches respectively, the former having come from Shetland, and the latter from New Zealand, but owing to the mutilation noted in our specimen, the animal only ossified 10¾ inches of the beak (274 mm. in exact measurement), the remainder having been spongy, or semi-cartilaginous in life. This is our rendition of the story gathered from information supplied by other whales, whose spongy beak tips have been wounded during fights. It is only fair to say, however, that some workers would regard the mutilations as being post mortem, with subsequent sand blasting of the snapped bones, until they stimulated pathogenic effects. The uptilted intermaxillary suggests reparative results, incidental upon inflammation, but if the conditions that obtain were post mortem, then the cranial asymmetry was spiral, and the specimen has been embedded, tip outwards, in some protective strata, and slowly sand worked to its present state. Here the want of field notes is manifest. The greatest width of the specimen is 97 mm., and its weight is 4 lb. 50 drachms. The outline of the specimen does not suggest Cuvier's Whale, already recorded by us from Tasmania (2), (3).

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(1) Report on the Cetacea collected by H.M.S. *Challenger.*

(2) "Studies in Tasmanian Cetacea," Scott & Lord, P. & P. Roy. Soc. Tas., 1919, pp. 1-10.

(3) "New or Little Known Fossils in the National Museum," F. Chapman, Proc. Roy. Soc. Vic., N.S., Pt. I., 1927.

STUDIES IN TASMANIAN SPIDERS.

PART II.

By

V. V. HICKMAN, B.A., B.Sc.

Plates XXI. to XXVI. and Eight Text Figures.

(Read 17th November, 1927.)

Family AVICULARIIDÆ.

Sub-Family CTENIZINÆ.

Genus *Aganippe*, O. P. Cambr.

Aganippe tasmanica, sp. nov.

Plates XXI. and XXII.

The description of the female is as follows:—

Measurements in millimetres (excluding the falces)

Total Length	27.0
Length of Cephalothorax	12.0
Breadth of Cephalothorax	10.0
Length of Abdomen	16.0
Breadth of Abdomen	13.0

Leg.	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	4.0	7.0	7.0	4.5	22.5
2	4.0	7.0	7.0	5.0	23.0
3	4.0	7.0	7.0	5.5	23.5
4	5.0	9.0	9.0	7.5	30.5
				Tarsus	
Palpi	5.0	6.0	6.0	3.5	20.5

Cephalothorax: Brown, arched, clothed with long, fine, erect hairs and thin black bristles on the cephalic part; and with long, fine erect hairs and down-lying matted grey hair on the thoracic part.

Pars Cephalica: Arched, ascending; a median row of black bristles extends from the fovea to the ocular area and each bristle is mounted on a small tubercle. The segmental

groove is well marked by a deep pit on each side. The front margin on each side of the ocular area is lighter in colour than the rest of the surface.

Ocular Area: Dark brown, raised, arched, one and three-fifth times as broad as it is long. There is a group of bristles in front and in rear of the anterior median eyes.

Clypeus: Wide, transversely wrinkled, hyaline.

Pars Thoracica: Gently arched from side to side and sloping gradually to the rear margin, which is slightly indented.

Thoracic Fovea: Very deep, wide and strongly procurved.

Marginal Band: Reflexed and thickly fringed with long fine grey hairs towards the rear.

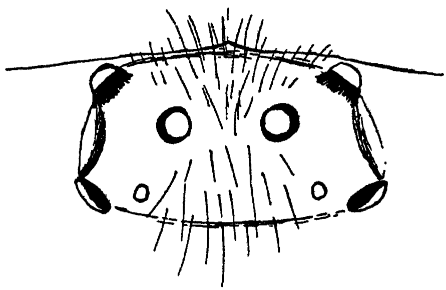

Fig. 1. *Aganippe tasmanica* (*sp. nov.*). Eyes in female.

Eyes: In two rows arranged in a group on a tubercular eminence. The front row is strongly procurved and shorter than the rear row. The rear row is procurved in front and recurved behind. A line drawn tangential to the rear edge of the anterior laterals passes in front of the anterior medians without touching them. The distance between the anterior medians is equal to two and a half times their individual diameter. The front laterals are nearly round, and one and a half times the diameter of a front median eye. The rear laterals are elliptical in shape, their long diameter being nearly twice the diameter of a front median eye. The rear medians are the smallest of the group, and separated from each other by about two and a half times the distance between the two front median eyes. The rear laterals are separated from the rear medians by a distance equal to about one and three-quarter times the diameter of a front median eye. (See Fig. 1.)

Legs: Sturdy, brown in colour, and not very long. Relative lengths 4, 3, 2, 1. It will be noticed from the measurements given above that legs 3, 2, and 1 are almost equal in length and not much longer than the palpi. The tarsi and metatarsi of legs 1 and 2 are thickly scopulated. There are spines on all the tarsi and metatarsi, those on the outer side of tarsi 4 being especially numerous. All the legs are densely clothed, particularly on the under side, with long thin black bristles and long fine hairs. On the upper side bare spaces are visible. On the under side of coxæ and femora 2, 3, and 4 there is a little down-lying grey hair similar to that on the sternum. Each of the tibial segments is provided with two or three spines on the under side near the apex. The coxæ of legs 4 meet behind the sternum. The superior tarsal claws are provided with a small tooth near the base and a large tooth. The inferior claw is small and bare.

Palpi: Moderately long, similar in colour and clothing to the legs. Tarsi thickly scopulated. Tibiæ more heavily armed with spines than in the case of the legs. The single claw is provided with a small tooth near the base and a large tooth.

Falces: Strong, well curved, moderately long, clothed with black bristles, but having bare patches on the upper surface. The rastellum consists of a large number of strong teeth placed close together on the front of the falces. The fang is fairly long and well curved. The inner margin of the falx sheath is provided with a row of 7 or 8 large teeth. The outer margin is provided with a thick fringe of hair and a row of 8 smaller teeth, while there is also an intermediate row of about seven minute teeth.

Maxillæ: Brown, divergent, moderately broad, clothed with very long hair and bristles, and thickly fringed along the inner margin with yellowish brown hair. A small group of nine or ten spines is placed at the lower inner angle.

Labium: Brown, submerged, arched, almost square, front edge slightly indented, clothed with a few long bristles but devoid of spines.

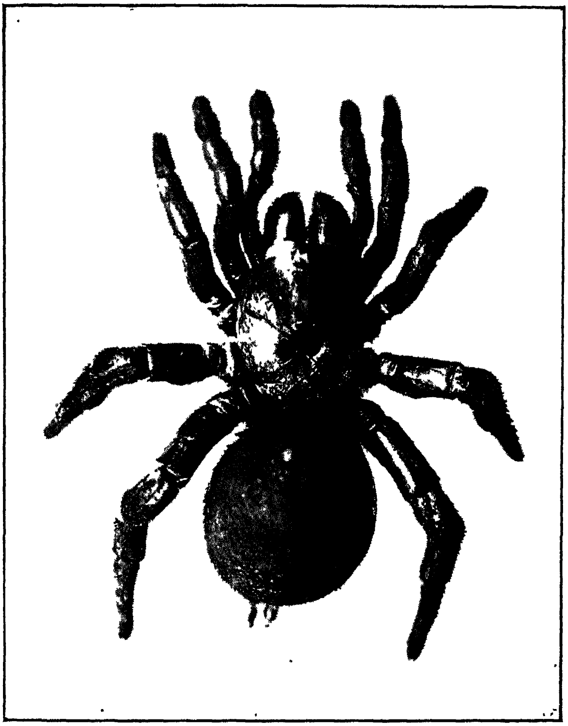

Fig. 1. *Aganippe tasmanica* (*sp. nov.*) ♀.

Fig. 2. *Aganippe tasmanica* (*sp. nov.*).
Nest open.

Fig. 3. *Aganippe tasmanica* (*sp. nov.*).
Nest closed.

Sternum: Brown, broadly pyriform, clothed with erect black bristles and with down-lying greyish hair towards the rear.

Sigilla: Rear pair large, removed from the margin and placed between the coxæ of the third pair of legs. The second pair of sigilla are small, placed near the margin and between the coxæ of the second pair of legs. The first pair small, marginal, and hidden by the coxæ of the first pair of legs.

Abdomen: Ovate, slightly overhanging the base of the cephalothorax, hairy, dark brown. A pair of muscle impressions are present on the dorsal surface near the front. No distinct pattern can be seen. The under surface hairy and somewhat lighter in colour than the dorsal surface.

Spinnerets: Very hairy, short, the first joint of the superior pair longest, the third joint shortest and dome shaped. The inferior pair are very small and close together.

Locality: Prince of Wales Bay, Derwent Park, 29th April, 1927.

Field Notes: Four specimens were collected. In each case the nest was made in a bank just above high tide mark. The burrow went into the bank almost horizontally for a distance of 21.0 cm. It had a diameter of 18.0 mm. near the opening, but was somewhat enlarged at the inner end. The mouth of the burrow was closed with a firm, neatly-fitting lid of the wafer type, and just inside the opening the nest was thickly lined with silk. Farther in the lining became gradually thinner, so that the inner end of the burrow had little or no silk covering the wall.

One of the nests was closed with a double lid. (See Plate XXII., Figs. 2 and 3.) This, however, seems an unusual occurrence. The spider generally increases the size of the lid by adding to its margin, but in this case an entirely new lid seems to have been made, the smaller and older lid being left on top of it and still attached by its own hinge. Perhaps some obstruction made it impossible for the spider to close the old lid properly, and hence a new lid became necessary. The outside of the lid was decorated with lichens, and closely resembled the surrounding soil.

Genus *Arbanitis*, L. Koch.

Arbanitis mestoni, *sp. nov.*

Plate XXIII., Figs. 4 and 5.

The description of the male is as follows:—

Measurements in millimetres (excluding the falces).

Total Length	13.0
Length of Cephalothorax	7.0
Breadth of Cephalothorax	5.0
Length of Abdomen	6.0
Breadth of Abdomen	4.0

Leg.	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	3.0	7.0	7.0	7.0	24.0
2	2.5	6.0	6.5	6.5	21.5
3	2.5	5.0	5.0	6.5	19.0
4	2.5	7.0	8.0	8.0	25.5
				Tarsus	
Palpi	2.5	4.0	5.0	1.5	13.0

Cephalothorax: Obovate, brown, thinly clothed with short down-lying bristles.

Pars Cephalica: Arched, gently ascending, dark brown, thinly clothed with short down-lying bristles, which, however, are more numerous than on the thoracic part. Segmental groove well defined.

Ocular Area: Arched and well raised above the rest of the cephalic area.

Clypeus: Narrow, hyaline, transversely wrinkled, furnished with 9 or 10 small bristles in front of the median eyes.

Pars Thoracica: Brown, sloping gently to the rear, slightly arched, radial grooves distinct but not deep. A pair of conspicuous spines are placed one on each side, just in front of the abdomen, with a third smaller spine midway between them.

Thoracic Fovea: Small, deep, straight.

Marginal Band: Dark brown, very slightly reflexed, fringed with coarse spine-like bristles from the rear to the front.

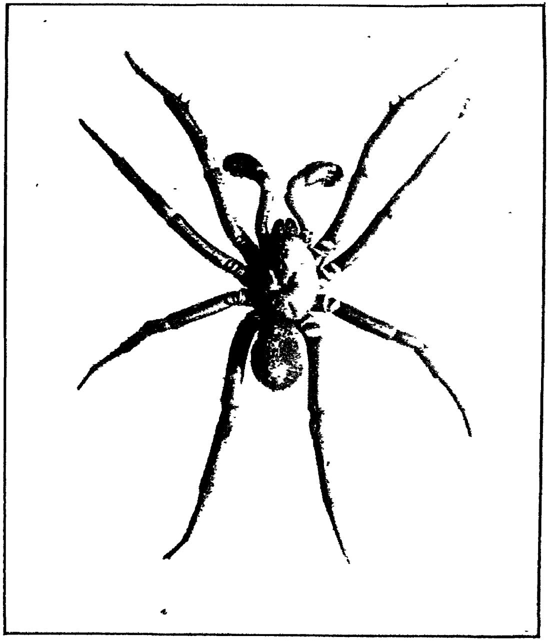

Fig. 4. *Arbanitis mestoni* (*sp. nov.*) ♂.

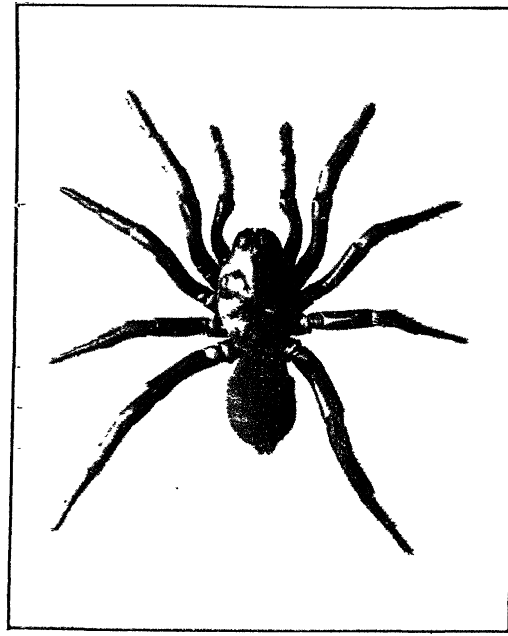

Fig. 5. *Arbanitis mestoni* (*sp. nov.*) ♀.

Eyes: Mounted on a well-raised tubercle. The two front median eyes are much higher than the others. The front row of eyes is strongly procurved; the rear row is recurved on its posterior margin, but almost straight on its anterior margin. The front median eyes are separated from each other by a space slightly less than two-thirds of their individual diameter and from their lateral neighbours by slightly more than this distance. The front lateral eyes are the largest of the group, and have a long diameter about one and two-third times the diameter of a front median eye. The rear laterals are next in size, being about three-quarters the size of the front laterals, from which they are separated by a distance equal to one-half the diameter of a front median eye. The rear medians are close to the rear laterals, their long diameter equals the diameter of a front median eye, and they are separated from each other by a distance equal to twice the diameter of a front median eye. (See Fig. 2.)

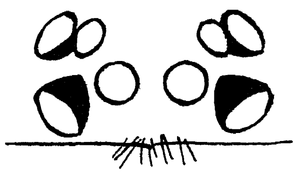

Fig. 2. *Arbanitis mestoni* (*sp. nov.*). Eyes in male.

Legs: Concolorous with the cephalothorax, long and tapering. Relative lengths 4, 1, 2, 3. The tarsi of the first two pairs of legs are provided with a very light scopula, which does not extend on to the metatarsi. The tarsal, metatarsal, tibial, and femoral segments of all the legs are furnished with spines. The clothing of the legs consists of bristles, which are so coarse that it is difficult to distinguish the larger ones from spines. There is very little hair on the legs. Tibia 1 is provided with two apophyses near the apex on the inner side. Each apophysis ends in a pair of flattened prongs. (See Fig. 3.) The superior tarsal claws are long and provided with three large teeth near the base and four smaller teeth on the side. The inferior claw is small and bare.

Palpi: Slightly more than half the length of leg 1, lightly clothed with coarse bristles and short hairs, concolorous with the legs; tibial segment much enlarged and furnished with an apophysis beset with spines, which, however, do not extend up to the apex of the segment. Bulb pyriform,

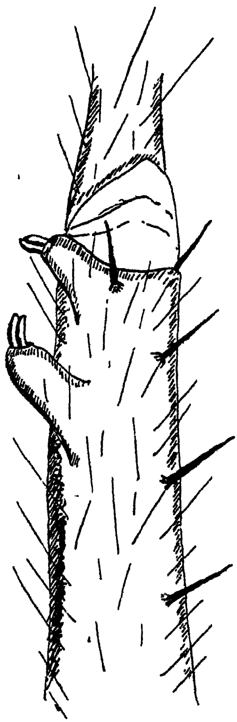

Fig. 3. *Arbanitis mestoni* (*sp. nov.*). Apex of tibia I. of male from below.

bilobed, shining, produced into a moderately long, twisted style. (See Fig. 4.) There is some resemblance between the palpus of this spider and that of *Arbanitis scaurus* (1). In the latter, however, the style is much shorter, the spines are distributed from the apophysis to the apex of the tibia and the segment is more inflated.

Falces: Small, dark brown, clothed with black bristles. Rastellum is composed of four or five rather long spine-like teeth on the front of each falx. The fang long, dark brown, and well curved.

Maxillæ: Brown, small, divergent, lightly clothed with short black hairs, inner margin provided with a thick fringe of yellow hair. No spines present.

Labium: Brown, almost square, truncated in front and slightly indented, its front margin is clothed with a few black bristles. No spines present.

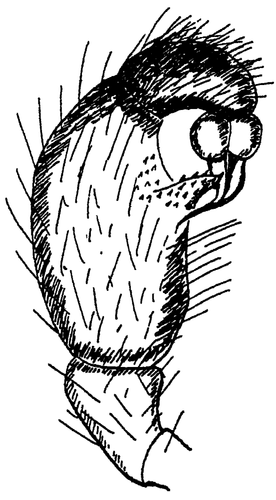

Fig. 4. *Arbanitis mestoni* (*sp. nov.*). Palpus of male from outer side.

Sternum: Long oval in shape, brown, lightly clothed with black bristle-like hairs.

Sigilla: Small, very indistinct, and placed near the margin.

Abdomen: Obovate, upper surface dark brown with indistinct markings of a lighter brown; clothed with short, black, coarse, down-lying hairs and very coarse erect spines mounted on tubercles. Under surface yellowish brown clothed with coarse black hairs. Lung covers yellowish.

Spinnerets: Yellowish and hairy. Superior pair thick and short, the first joint being equal in length to the other two joints combined. Tip of third joint rounded. Inferior pair small and about their own diameter apart.

The description of the female is as follows:—

Measurements in millimetres (excluding the falces).

Total Length	21.5
Length of Cephalothorax	10.0
Breadth of Cephalothorax	7.0
Length of Abdomen	11.5
Breadth of Abdomen	7.0

Leg.	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	3.5	7.0	7.5	5.0	23.0
2	3.0	6.0	6.0	4.5	19.5
3	2.5	4.5	5.0	5.0	17.0
4	3.0	6.0	8.5	6.5	24.0
				Tarsus	
Palpi	3.5	5.0	5.0	3.0	16.5

Cephalothorax: Ovate, brown, very thinly clothed with short bristle-like hairs.

Pars Cephalica: Arched, gently ascending, its highest point being about midway between the fovea and the eyes. A median row of bristles extends from the eye space to the fovea.

Ocular Area: Broader than long, well raised, arched, dark brown; there are a few bristles in front of the eyes and three or four between the rear median eyes.

Clypeus: Moderately deep, sloping forward, transversely wrinkled and hyaline.

Pars Thoracica: Slightly arched and gently sloping to the rear; radial grooves distinct.

Thoracic Fovea: Straight, deep, and moderately wide.

Marginal Band: Slightly reflexed, fringed with short brown hairs.

Eyes: Mounted in two rows; front row strongly procurved, rear row recurved on its rear margin, but almost straight on its front margin. The round front median eyes are well raised above the others, and are separated from each other by a space equal to one and one-eighth times their individual diameter. The elliptical front laterals are the largest of the group, their long diameter being equal to about one and two-third times the diameter of a front median eye. The rear laterals are slightly smaller than the front laterals, from which they are separated by a space equal to half the long diameter of the latter. The rear medians have a long diameter equal to the diameter of a front median eye. They are separated from each other by a space equal to nearly three times that which separates the front medians. The front laterals are separated from the front medians by a space almost equal to the diameter of the latter. (See Fig. 5.)

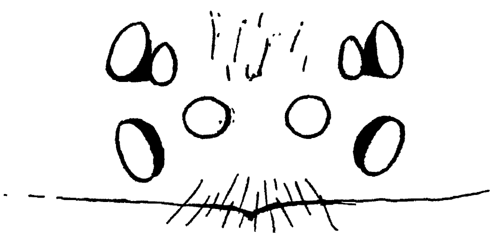

Fig. 5. *Arbanitis mestoni* (*sp. nov.*). Eyes in female.

Legs: Light brown, thinly clothed with black bristles; longitudinal bare stripes are visible on the upper side of the femora, patellæ, and tibiæ. Relative lengths 4, 1, 2, 3. The tarsi and metatarsi of the first and second pairs of legs are scopulated, but in the case of the second pair the scopula extends only a short way along the inner margin of the under side of the metatarsus, the greater portion of the segment being devoid of a scopula. Spines are present on the under side of all the tarsi and metatarsi. The tibial segments of the first two pairs of legs are also armed with 8 or 9 long prominent spines on the outer margin of the under side. The superior tarsal claws each have a large tooth and a very small tooth close together near the base of the claw. The inferior claw is small and bare.

Palpi: Similar in colour and clothing to the legs. There are strong spines on the under side of the tarsus, tibia, and

patella, those on the tarsus standing out from a moderately thick scopula. The single tarsal claw has two teeth near the base.

Falces: Moderately large, black, clothed with coarse black bristles and provided with a rastellum in front. Fang well curved and dark reddish brown in colour. The outer margin of furrow furnished with a fringe of long yellow hairs, and the inner margin with a row of seven large teeth, while there is also an intermediate row of seven or eight small teeth.

Maxillæ: Light brown, hairy, moderately long; the inner margin provided with a yellow fringe; the base ends in an obtuse point; a group of 19 or 20 spines is found near the inner angle.

Labium: Short, broad, submerged, arched, truncated, provided with a few long black bristles, but no spines.

Sternum: Brown, pyriform, lightly clothed with erect black bristles.

Sigilla: Small and indistinct; the first pair marginal, the second and third pairs removed a short distance from the margin.

Abdomen: Obovate, upper surface dark brown, clothed with black hairs and long, thin tapering spines mounted on tubercles; no distinct pattern visible. The under surface also dark brown and clothed with black hairs, but devoid of spines. Lung covers dark brown.

Spinnerets: Dark brown, short, hairy, the first joint of the superior pair longest, the third shortest. The inferior pair small, cylindrical, and separated by a space equal to one and a half times their individual diameter.

Locality: Woodsdale, 24th April, 1927.

Field Notes: The nests were numerous at the locality mentioned, and generally made in the side of a grassy bank. In some instances the burrow was almost horizontal. It was not provided with a lid, but the opening was surrounded by a collar of grass stalks matted together with silk. One of these collars measured 2.5 cm. high. The length of the burrow was about 13 cm. A thick silk lining covered the walls just inside the opening, but the inner end of the nest, which was slightly enlarged, had no lining.

This spider is named in honour of A. L. Meston, Esq., M.A., by whom it was discovered, and to whom I am indebted for the above field notes.

Fig. 6. Web of *Ectatosticta troglodytes* (Higg. and Pett.), among the rocks at the Forth Falls.

Family HYPOCHILIDÆ.

Genus *Ectatosticta*, Simon.

The Distribution of the Cave Spider, *Ectatosticta troglodytes* (Higg. and Pett.), in Tasmania, with notes on its web and a description of the male.

Plate XXIV., Fig. 6.

This remarkable spider, which Dr. Pulleine (2) calls "Tasmania's most aristocratic spider," was first recorded from a Chudleigh cave in 1883, and described by Higgins and Petterd (3) under the name of *Theridion troglodytes*. In 1904 W. J. Rainbow (4) gave a more detailed description of the spider under the name of *Ectatosticta troglodytes*, and recorded its occurrence in shallow sandstone caves on the banks of the Pieman River. The habit of often living in caves has given rise to the belief that the spider is confined to caves. This, however, is not the case, for in May, 1926, I found an immature specimen under a log on Mt. Arthur, near Lilydale. During the latter part of December, 1926, through the kindness of Mr. G. Craw, I had the opportunity of collecting several specimens in the vicinity of the Forth Falls, near Sheffield. At this locality the spider had built its web among the rocks in the gully leading up to the falls. The large horizontal sheets of web, hung between the moss-covered stones, were quite conspicuous. During the day-time attempts were made to entice the spider from its hiding place beneath the rocks by dropping live insects on to the web, but all to no purpose; the spider resolutely refused to come out. There was nothing to do but to wait till night time and then repeat the experiments. The positions of several webs were accordingly noted, and as soon as it was dark lanterns were lighted and another attempt made. No sooner had the struggling insect fallen on to the upper side of the web than the spider rushed out on the lower side and seized it through the web. The spider was then easily caught in a tin before it had time to regain its retreat under the rocks. A moderately large tin was required, since *E. troglodytes*, when fully grown, has a spread of legs amounting to as much as seven inches. In the above way an adult male and several females were secured.

Some weeks later, on the 25th January, 1927, I collected several specimens of this spider at Lenah Valley, near the

foot of Mount Wellington. A male was taken from under a heap of forest débris, while a female and an old deserted egg sac were discovered in a hollow log.

The spider is also sometimes found in abandoned mine shafts on the Zeehan mining field. It would seem therefore that it is widely distributed throughout the State, and not merely confined to caves.

The web of this spider always takes the form of a horizontal sheet, which under favourable conditions may attain relatively large proportions. In a small narrow cave at Mole Creek a web was found suspended between the two walls of the cave, and it measured four feet long by nearly two feet wide. One end of the sheet led into a dark recess occupied by the spider. The threads, which form the framework of the web, are smooth, but the meshes are composed of a hackled band. This hackled band is intermediate in structure between that of *Amaurobius* and that of *Uloborus*. It consists of two smooth parallel threads supporting a band of viscid silk. The much curled threads of *Amaurobius* are not represented, but the edges of the viscid band show an undulating pattern approaching the lobed structure in the hackled band of *Uloborus*.

The description of the male is as follows:—

Measurements in millimetres.

Total Length	16.0
Length of Cephalothorax	8.0
Breadth of Cephalothorax	6.0
Length of Abdomen	9.0
Breadth of Abdomen	6.0

Leg	Coxa	Trochanter	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	3.0	1.0	26.0	4.0	27.0	25.5	11.5	98.0
2	3.0	0.7	20.0	4.0	20.5	15.5	7.5	71.2
3	2.5	0.6	16.5	3.0	15.0	14.0	5.5	57.1
4	2.5	0.6	19.0	3.0	17.0	18.0	7.0	67.1

The male resembles the female in colour, clothing, size, and general appearance. Therefore it will be necessary to describe only the following features.

Legs: Long and tapering, concolorous with the cephalothorax; tibial, metatarsal, and femoral segments clothed with long fine hairs which curve outwards from the leg, and armed with long straight spines. The tarsal segments are clothed with short hairs and armed with a few short spines underneath. The patellæ are smooth. The most characteristic feature is the peculiar curve in the metatarsi of the second pair of legs. (See Fig. 6.) Superior tarsal claws have 13 teeth; the inferior claw is small and bare.

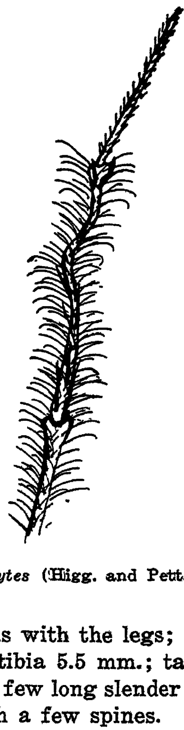

Fig. 6. *Ectatosticta troglodytes* (Higg. and Pett.). Metatarsus II. in male.

Palpi: Concolorous with the legs; trochanter and femur 7.0 mm.; patella and tibia 5.5 mm.; tarsus 3.0 mm.; clothed with short hairs and a few long slender bristles. The femoral segment is armed with a few spines. There is a slight protuberance on the under side of the tibia near its apex, and at this point the clothing of hair is more dense. The tarsus is long and relatively thick near the base, but gradually tapers to a blunt-pointed extremity. On the under side near the base of the tarsus is a bunch of very long coarse hairs which projects under the bulb. The genital bulb is simple, and produced into a long conductor, which reaches nearly to the end of the tarsus. There is a marked difference between

the palpus of this spider and that of its nearest relative, *E. davidi* (Simon) (5), which occurs in China. In the case of the latter the genital bulb is attached almost at the extremity of the tarsus, while in the Tasmanian spider it is attached near the base. (See Fig. 7.)

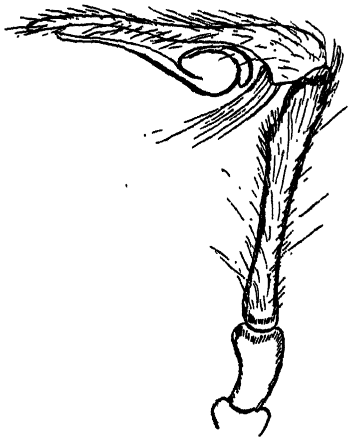

Fig. 7. *Ectatosticta troglodytes* (Higg. and Pett.). Left palpus of male viewed from outer side.

Falces: Superior margin of sheath armed with a row of five large teeth; the inferior margin smooth for the greater part of its length, but possesses a group of twenty-two minute teeth near its base and opposite the last two teeth on the superior margin.

Family ARGIOPIDÆ.

Sub-Family Argiopinæ.

Genus *Cyrtophora* (Simon).

The Web and Habits of *Cyrtophora parnasia* (L. Koch) (6).

Plates XXV. and XXVI.

The webs of spiders belonging to the genus *Cyrtophora*, E. Simon, *Hentzia*, McCook, are of a very interesting nature. Probably the most complete account of one of these webs is that given by Dr. McCook (7) in reference to the American spider, *Hentzia basilica*. Other descriptions have been given by Walckenaer (8), Ausserer (9), Workman (10), Simon (11), and Rainbow (12). Most of these descriptions are brief, and do not deal with the finer architectural details of the webs.

Consequently, as Professor Comstock (13) points out, there are still several important questions concerning the structure of these webs to be answered.

The most common Tasmanian species of the genus *Cyrtophora* is *C. parnasia* (L. Koch). It occurs in fair numbers on the Trevallyn Hills, particularly on the slopes which face the morning sun. The web is generally placed about sixty centimetres from the ground in a tussock of cutting grass (*Gahnia psittacorum*, Lab.). The whole snare consists of an irregular network of threads, in the centre of which is suspended an open silken cone. (See Fig. 8.) This

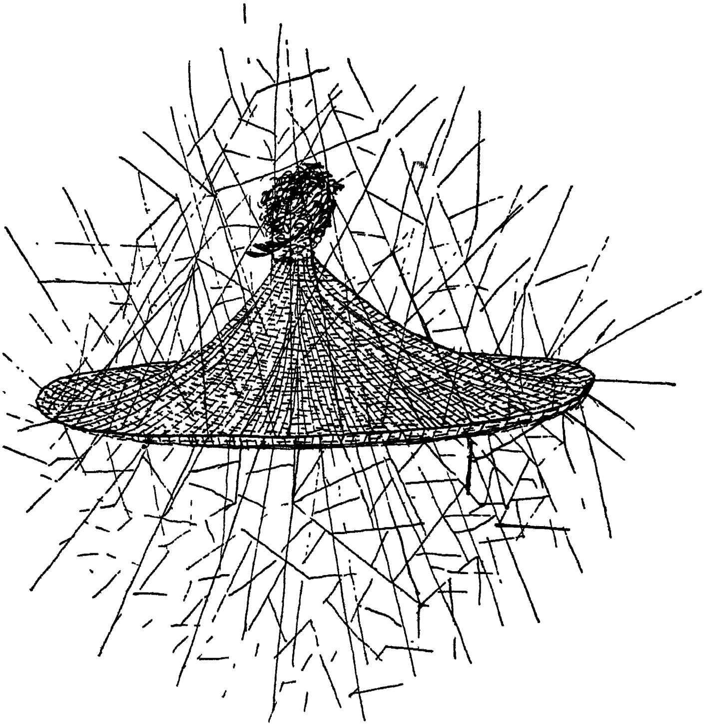

Fig. 8. Web of *Cyrtophora parnasia* (L. Koch).

inner conical portion will be referred to as the dome of the web. The margin of the dome is slightly reflexed, and the apex leads into a snug retreat occupied by the spider. This retreat is made of dry leaves and twigs interwoven with quantities of the softest silk. (See Plate XXV., Fig. 7.) It

opens downwards. The whole web is about 30 centimetres in height and 25 centimetres in width. The diameter of the dome is almost equal to the width of the web. The apex of the dome is about 8 centimetres higher than the margin. Extending downwards and outwards from the apex to the margin are numerous rays. These are intersected by the turns of a closely woven spiral passing round the dome from apex to margin. At first glance the dome bears some resemblance to a closely-woven orbicular snare of the usual argiopid type, which has been hung in a horizontal plane, and whose centre has been drawn up. Closer inspection, however, reveals the fact that there is no hub, its place being taken by the spider's retreat. The usual notched zone and free space are also absent. In the field it is almost impossible to count the number of rays and the number of turns in the spiral, since the threads are so very fine and close together. However, if the outer irregular network be cut away, it is not difficult to mount a representative portion of the dome between two plates of glass as described by Professor Comstock ([14]). This enables the counting to be done under the microscope. By this means it was found that the dome of *C. parnasia* is made up of about 200 rays (counted near the apex) and 250 turns in the spiral. Many of the rays are branched so that the space between two adjacent rays near the margin of the dome is not greater than that between two near the apex. This branching of the rays is also seen in the webs of certain species of *Nephila* ([15]). It renders the meshes of the web more uniform in size. In the case of *C. parnasia* the meshes are nearly square, the interval between adjacent rays being about 0.75 mm., and that between adjacent turns in the spiral about 0.70 mm. Both the rays and the spiral are dry and inelastic, thus resembling the threads of the notched zone in the ordinary orbicular snare. When highly magnified the thread forming the rays and the spiral is seen to consist of two separate strands twisted together. At the points where the spiral crosses a ray it appears to be twisted round the ray several times, and not merely fastened with an attachment disc. (See Plate XXV., Fig. 8.)

The outer irregular network serves mainly as a support for the dome and the nest. It may also be intended to impede the flight of insects, but the spider appears to take very little notice of an insect entangled in it. When, however, the struggles of the victim cause it to fall through the outer network on to the upper side of the dome, the spider immediately rushes out on the under side. When a little way from

the nest the spider stops and shakes the web vigorously. It then advances a little farther towards its prey, hesitates, and again shakes the web. Finally, when satisfied that the shaking has entangled the legs of its victim in the fine meshes, the spider seizes it and enswathes it in silk, turning it over and over as is the usual custom with the *Argiopidæ*.

The egg sacs, generally two in number, are woven into the soft fluffy silk of the nest, and thus effectually concealed. There are about ninety eggs in each sac. They are yellow in colour, and massed together in a more or less spherical heap. (See Plate XXVI., Fig. 9.) The silk in close contact with the eggs is of a silvery grey colour, and densely woven above and below the eggs, forming, as it were, two valves united by more delicate tissue. This covering is surrounded by a layer of grey fluffy silk, the surface of which is decorated with peculiar dark coloured tufts of twisted silk resembling those made by *Tetragnatha*. (See Plate XXVI., Fig. 10.) These little tufts are generally hidden in the fluffy silk of the nest, and it is only by careful dissection that the various parts of the egg sac can be separated.

Types: The type specimens of spiders described in the above paper will be placed in the Queen Victoria Museum, Launceston.

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THE GROWTH OF SELF-GOVERNMENT IN TASMANIA.*

By

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(Read 17th November, 1927.)

The loss of the American Colonies in 1783 did not convince the statesmen of Great Britain that the grant of self-government was the only way to retain colonies; but it had lasting effects on the British colonial policy. Colonies, with rare exceptions, had been founded to increase the commerce of the Mother-Country by providing her with markets for the export of her manufactures. This commercial conception of Empire was still uppermost after the loss of our American colonies, and the discovery that British exports to America increased instead of diminishing after the grant of independence raised doubts about the value of colonies.

In describing the future of colonies Turgot, in the 18th century, said: "Colonies are like fruits which cling to the "tree only till they ripen. As soon as America can take care "of herself she will do what Carthage did." Twenty years later this prophecy received striking fulfilment in the American War of Independence. Little wonder is it that with the fulfilment of Turgot's prophecy, and the discovery that our exports to America increased instead of diminishing after the grant of independence, grave doubts were raised in Great Britain about the value of colonies. These doubts explain the comparative indifference of public opinion towards colonies during the first thirty or forty years of our own history.

In all colonies after the loss of her American empire, Great Britain adopted a uniform policy in regard to government. This was in striking contrast with what had been practised before, when local legislatures were granted to every colony acquired by cession or by occupation (1); conquered colonies, however, were ruled by governors and execu-

*For the sake of convenience, the name Tasmania has been used throughout this paper, although the name Van Diemen's Land was official until 1855.

(1) Report of Committee of Trade and Plantations, 1849.

tive councils appointed by the Crown. All new colonies, however acquired, were treated as conquered colonies, that is, they were not granted local legislatures, but coming under the Royal prerogative were controlled by governors and nominated executive councils. This attitude to conquered colonies was in accord with English law, for the Crown had "uncontrolled legislative authority over the conquered "or *ceded colony*" (2). The Crown might govern a conquered colony by means of a governor and a nominee council, or grant representative government.

That New South Wales and Tasmania should be treated as conquered colonies was, at their foundation, quite in accord with this principle of English law. Both were occupied as military posts. The first occupants consisted entirely of soldiers, civilians attached to the military, and convicts. The powers claimed and exercised by the early governors of publishing General Orders, by which they could do anything on their own authority, were all military in character, and were tolerated under the plea that for all practical purposes there was a state of war between the authorities and the convicts; in other words, that the colony was a conquered possession. That a state of war existed between Great Britain and France assisted in the maintenance of a military form of government.

That Great Britain fully recognised and was determined to maintain this arbitrary form of government is clearly shown by the appointment of none but naval or military officers as governors. The names of the early governors—Lieutenant Bowen, Lt.-Colonel David Collins, Colonel Paterson, Colonel Davey, Colonel William Sorell, Lt.-Colonel George Arthur, Sir John Franklin, Capt. in the Royal Navy—give evidence of this, and it was not until the appointment of Sir John Eardley-Wilmot in 1843 that we had a civilian governor.

At first the whole community was in economic dependence upon the Government, which supplied rations, seeds, and tools for farms, and took all the produce at a fixed price; but it is in the administration of justice that the arbitrary military character of the early rule is best shown. The governor was the final court of appeal in all cases. In 1787 a charter for establishing Courts of Civil and Criminal

(2) Keith: *Responsible Government in the Dominions*, 1912, Vol. I., p. 2.

Jurisdiction was granted, and a Vice-Admiralty Court was constituted. The Court of Civil Jurisdiction was constituted by the Deputy-Judge-Advocate appointed by the Crown, and two fit and proper persons residing in the colony, nominated by the governor. The Court of Criminal Jurisdiction was constituted by the Deputy-Judge-Advocate, together with six officers of the sea and land service nominated by the governor. This Court had jurisdiction over all crimes under the laws of England, but could sentence prisoners to only two forms of punishment—flogging and death. The Judge-Advocate examined the evidence for the prosecution, and decided whether the prisoner should be tried. He then drew up the indictment. Although President of the Court he prosecuted on behalf of the Crown, and in deciding the verdict was one of the seven jurymen. In that members assembled in full uniform, in the duration of the Court and the method of summoning members, there was a marked similarity to a court-martial; but it differed from a court-martial in that, in a court-martial, the Deputy-Judge-Advocate would have neither vote nor voice in the judgment of the Court. The Vice-Admiralty Court was also military in character, the judge being a military officer.

As Tasmania was a dependency of New South Wales until 1825, it came under the jurisdictions of these courts, and, in fact, was much worse off than New South Wales, for, as there were no separate courts of justice for Tasmania, all cases arising in Tasmania were summoned for trial at Sydney. In spite of universal condemnation this civil jurisdiction was maintained until 1824.

In 1814 the first step towards freedom was granted Tasmania, when independent courts of civil jurisdiction were created. These were of two kinds, the Supreme Court, which held sittings in New South Wales and in Tasmania, and heard all cases involving more than £50, and the Governor's Courts, one in New South Wales and one in Tasmania for the trial of less important cases. The Tasmanian Court, known as the Lieutenant-Governor's Court, was constituted by the Deputy-Judge-Advocate of Tasmania and two fit and proper persons inhabiting Tasmania nominated by the Lieutenant-Governor. There still was no trial by jury, and whatever may be its defects, an Englishman is not satisfied to have the criminal law administered in any other way. The position of the Judge-Advocate was still unsatisfactory, for he continued by virtue of his position to set in motion

Crown prosecutions, and at the same time to act as a judge of their validity, to prosecute the prisoner, and to vote in deciding the verdict.

Between November, 1807, and December, 1808, the population of Tasmania was more than doubled by an influx of 554 free settlers from Norfolk Island (3). This, however, while changing the character of the State from mainly convict to mainly free, did not affect the dependence upon the Government, for the community had to be fed and clothed from the Government stores. In 1813 a number of disbanded marines took up land, and in 1815 the first immigration ship with free settlers arrived. A stream of immigration now set in (in one year there were 600 immigrants), and Tasmania attracted far more settlers than the mainland. In 1818 the applications for land grants were so numerous that all grants were suspended for a year. A period of great prosperity now ensued, and Tasmania grew rapidly. The population which in 1811 was 1,500 had grown to 7,400 by 1821. The Hobart of 1823 contained "about 600 houses and "3,500 inhabitants, while new buildings were rising every "day" (4). The value of Tasmanian exports rose, and material prosperity was visible on all sides. In 1816 the first newspaper appeared.

The growth of New South Wales, the reports that were continually reaching England of maladministration by arbitrary governors, and colonial dissatisfaction with despotic rule, roused the British Government to review their policy. At first a London barrister, J. T. Bigge, was sent out in 1819 to examine the laws, regulations, and usages of the settlement, the mode of government, the treatment of the convicts, and every other matter connected with the transportation system. As a result of his inquiry, which took two years, a beginning was made in constitutional government.

New South Wales had by 1819 become in reality a settlement colony, for the convicts were outnumbered by the free settlers, and some change had to come. Consequent upon Bigge's report, the British Parliament in 1823 passed an Act to provide for the better administration of justice in New South Wales and Van Diemen's Land and for the more effectual government thereof. While this Act did not bring representative government, it was a substantial gain towards freedom. British Ministers had not yet forgotten

(3) James B. Walker: *Early Tasmania*, p. 162.

(4) Edward Curr: *An Account of the Colony of V.D.L.*, p. 5.

the excesses of the French Revolution, and their tardiness in granting representative government is thus explained. By this Act the Judge-Advocate and his military assessors disappeared; Supreme Courts for New South Wales and for Tasmania respectively were established with civil, criminal, and ecclesiastical jurisdiction; trial by jury was permitted in civil cases if both parties agreed; if no agreement the Chief Justice and two magistrates gave the verdict; in criminal cases the decision was given by a Judge and seven officers of the army or navy, but the prisoner had the right of challenge. The Crown, by an Order in Council, might extend trial by jury as it thought fit. For the more effectual government of the colony a Legislative Council was established of not more than seven nor less than five members, with power to make laws "for the peace, welfare, and good "government" of New South Wales, provided that they were not repugnant to the laws of England. Clause 54 allowed Tasmania to be erected into a separate colony independent of New South Wales, and upon such foundation the 1823 Act was to apply to New South Wales and Tasmania alike.

In 1823 Lieutenant-Colonel George Arthur was appointed to administer Tasmania, and assumed office on the 14th of May, 1824. A clause in his commission is noteworthy, for it shows there was no doubt in the official mind as to the status of the colony. "You are to observe such orders "and instructions from time to time as you shall receive . . . "from any superior officer according to the rules and discip- "line of war."

Independence from New South Wales was, however, not long delayed. Mr. Bigge suggested to Lord Bathurst that the control of Tasmania by New South Wales should be limited and specifically stated. "Without positively stating "it is my opinion that the two Governments ought immedi- "ately to be separated and made independent of each other," he goes on to say, "I conceive that it is a measure that "should be kept in view" (5). On the 2nd of August, 1823, a petition signed by twelve leading residents was sent to Lord Bathurst asking for independence. The effect of the petition and Mr. Bigge's statement is shown clearly in the powers of the Lieutenant-Governor as set out when Arthur was appointed. Although Lord Bathurst wrote that it was "not "at present deemed expedient to effect a separation" (6), yet

(5) Bigge—Bathurst, 11th February, 1823.
(6) Bathurst—Brisbane, 28th August, 1823.

with the appointment of Lieutenant-Colonel Arthur a change came. Tasmania was for the first time recognised as an entity which required special rights and privileges. The control of the Governor at Sydney over the Lieutenant-Governor in Hobart was now limited. These measures were tentative and experimental, but the experimental stage did not last long. Arthur found Tasmania suffering disabilities, for the Council at Sydney put New South Wales first, often to the detriment of Tasmania, and advised the appointment of a local Council, and suggested members (7). He was prompted to this by a desire to free himself from irksome control rather than by a desire to serve the interests of the colonists. In November, 1824, a petition was again forwarded to Lord Bathurst by the colonists asking for independence, this time with 101 signatures. Moreover, it had the support of Colonel Sorell, the late governor, who carried it to England. The effect of the governor's advice and the colonists' petition was seen in an Order in Council of the 14th of June, whereby Tasmania was accorded self-government under the terms of the Act of 1823. This independence was proclaimed by Governor Darling at Hobart on the 3rd of December, 1825. The Governor of New South Wales was also the Governor of Tasmania, Lieutenant-Colonel Arthur was to be Lieutenant-Governor responsible to him, but Tasmania was to be quite independent of New South Wales. Governor Darling wisely let the overlordship remain nominal, and Arthur administered Tasmania unhampered.

By the same proclamation a nominee Legislative Council was instituted, and the following six members appointed:—John Lewis Pedder, Chief Justice; Dudley Montagu Percival, Colonial Secretary (these were to be succeeded by their successors in office); Edward Abbott, late Deputy-Judge-Advocate; William Henry Hamilton, Naval Officer; Adolarius William Henry Humphrey, Police Magistrate; and Edward Curr, chief agent of the Van Diemen's Land Company. An Executive Council, consisting of the Lieutenant-Governor, the Chief Justice, the Colonial Secretary, A. W. H. Humphrey, and Jocelyn Thomas, Colonial Secretary, was also appointed. The next year the Legislative Council was enlarged by the admission of Thomas Anstey to represent the agriculturists (8).

(7) Arthur—Horton, 28th October, 1824.

(8) Arthur—Bathurst, 21/4/26. Bathurst—Arthur, 2/10/26.

The colonists regarded this as a mere stepping-stone to better government, but Arthur, autocratic by nature, and a strict disciplinarian by reason of his military training, failed to be the least sympathetic with their aspirations. Moreover, he regarded the colony as established for convicts. He was pledged to the convict system, and held that the colony was founded for the regeneration of criminals and for the benefit of their descendants. He looked upon free immigrants as a means to this end, rather than as the settlers for whose benefit the island was to be administered. Any interference he resented. In consequence, the press, which criticised his administration, fell under his ban. He appointed a licence by ordinance, and made the continuation of a paper dependent on his pleasure.

Since the Constitutional Act of 1823 terminated on the 1st of July, 1827, the colonists held a meeting early in that year, and authorised a deputation to petition the British Government, through Governor Arthur, for trial by jury and a voice in the legislature. Arthur was hostile to the proposals, but was wrongly charged with slighting the deputation. The existing evidence entirely vindicates him (9). The British Ministers were adverse to the colonial request, but the Constitutional Act, which became law on the 25th of July, 1828, differed widely from the earlier one. The Legislative Council was increased to not less than ten and more than fifteen members, all nominated by the Crown and residents of the colony; any vacancy was to be filled by the Governor; two-thirds of the Council constituted a quorum; its President was the Governor, who had a deliberative and a casting vote; no law could be passed by the Crown or the Governor alone, but must be approved by a majority of the Council. The Chief Justice lost his power of absolute veto. If he declared a law invalid because it was repugnant to the laws of England, the Council must reconsider it, but if it still held to its decision the law became operative until vetoed by the British Government. The Council was authorised to institute trial by jury under such limitations as it deemed fit, but twelve years were to pass before trial by jury was adopted in criminal cases. This Act was to terminate in 1836, but it was extended until 1850.

Arthur's position was rendered more difficult by conditions in the world outside as well as by local developments. In 1825 the free settlers in Tasmania outnumbered the bond,

(9) Arthur—Bathurst, 23rd March, 1827, and enclosures.

and in 1829 a movement for colonial reform began in England. The leader of a very able group of men who had developed theories of colonisation with special reference to Australia, was Edward Gibbon Wakefield. Wakefield is well known as the propounder of a social and economic policy for colonisation; but too seldom is it realised that responsible self-government was one of the theories of colonisation propounded by him and his followers (10). Wakefield was imprisoned in Newgate for abduction in 1826. While there he "read with care every book concerning New South Wales "and Van Diemen's Land, as well as a long series of news-"papers published in those colonies" (11), and became interested in Australia. The term in Newgate was the turning point in the career of this clever young scapegrace. From now on he bent his energies towards the colonisation of Australia on rational lines, and in 1829 published in the *Morning Chronicle* his "Letters from Sydney," eleven in all (12). These letters purporting to come from a farmer in New South Wales were widely read and eagerly discussed in the literary and political world of London. So graphically written were they, that not only people in England, but even the colonists considered them authentic (13). In them he gave a vivid picture of the social, economic, and political conditions of New South Wales, and suggested a remedy. His views were adopted at once by many able and influential men, among whom were Charles Buller, Sir William Molesworth, R. S. Rintoul, editor of the *Spectator*, Colonel Torrens, and Lord Durham; and gained the approval and support of John Stuart Mill. After his release he worked indefatigably for the realisation of his schemes, writing pamphlets, supplying various papers with articles and letters, giving evidence before Parliamentary Committees, and winning men over to his views by his personal fascination and his all persuasive tongue. Although debarred from Parliament by his notorious early life, he was "the friend and bosom adviser of "Republicans and Radicals, Whig and Conservative Peers, "Low Church and High Church Bishops. Five Secretaries "of State for the Colonies—Lords Glenelg and Stanley, "Monteagle, Aberdeen, and Grey, were more or less his

(10) For Wakefield's views, see his *View of the Art of Colonisation*, 1849.

(11) *Punishment of Death*, 1831, p. 194.

(12) These were republished in book form before the end of 1829 under the title of *A Letter From Sydney*.

(13) *The Tasmanian*, 7/5/30 and 14/5/30.

"pupils" (14). His influence both at Home and in the colonies was enormous, and to him is due an awakening of interest in colonies among the British public.

Wakefield's value to Australia cannot be overestimated. Men began to consider emigration as a cure for social ills. Colonisation now proceeded on systematic lines. Instead of a land exploited by capitalists for their own advantage, filled with cheap coolie labour when the supply of convict labour failed, to which responsible self-government could never have been given, we find a stream of free immigrants bringing with them a hatred of oppression and tyranny, and demanding as inalienable rights—trial by jury and legislative assemblies.

The 'thirties found the countries of Western Europe thrown into turmoil by the members of the middle class demanding a voice in the government of their respective countries commensurate with their wealth and importance. An echo of the tumult was heard in Tasmania. To obtain redress of wrongs a Political Association was formed, and public meetings were held in Hobart for the purpose of bringing under Royal notice the condition of the colony; but all was vain. In 1835 the Political Association appointed a committee to take definite action. This body wrote to Governor Arthur and asked that he intercede with the Crown on behalf of free institutions. He was entirely unsympathetic, and replied that "he did not feel authorised without "the express sanction of His Majesty to enter into any "correspondence with such an organisation." Again outside events were to have important results upon the Australian colonies. In 1837 the Canadians, after years of struggle with the Executive, broke into open revolt. English statesmen were in despair, and disposed to think Canada would go the way of the earlier American colonies. Lord Durham, a disciple of Wakefield and a powerful supporter of his theories, was sent out by the Whig Government as "High "Commissioner for the adjustment of certain important "questions . . . respecting the form and future government" of Canada. The upshot of his appointment was the Durham Report, an epoch in colonial government. This report, the most valuable document in the English language on the subject of colonial policy, recommended that "the responsibility "to the Legislature of all officers of the Government, except "the Governor and his Secretary, should be secured by every

(14) *The Three Colonies of Australia*, Samuel Sidney, p. 95.

"means known to the British Constitution: The Governor "should be instructed that he must carry on his Government "by heads of departments, in whom the Legislature shall "impose confidence: and that he must look to no support from "Home in any contest with the Legislature except on points "involving strictly Imperial interests" (15). In other words he advocated responsible government for the colonies.

New South Wales was the first Australian colony to benefit, and in 1842 an Act was passed by both Houses of the British Parliament without a dissentient voice, creating a new Legislative Council for that colony, whereby representative government was obtained. The new body was to consist of thirty-six members, twenty-four of whom were to be elected, and twelve nominated. Of the nominee members, not more than six could be officials. The franchise was given to freeholders in land or tenements of the value of £200, or householders occupying premises worth £20 per annum. It was to sit at least once a year, and not to continue without a general election for more than five years; nominee members were to vacate their seats upon a dissolution. The Council thus constituted was to have power to legislate for the colony in any manner "not repugnant to the laws of "England." It was an adaptation of the English bi-cameral system, two distinct classes of members sitting in one Chamber.

Tasmania was not included in this Act, and the reason was evident. The British Government was resolved to make this colony a huge gaol for the Empire. Convicts began to pour in at the rate of four thousand a year, and at the end of three years, from 1841 to 1844, no fewer than 15,000 convicts had arrived from all parts of the Empire, in spite of the opposition of the free settlers, who saw with deep concern the rising tide of convictism. The maintenance of police and gaols was a charge on colonial revenue, and with the vast increase in the number of convicts the expenditure reached alarming figures. To all petitions for relief, Lord Stanley was obdurate. In plain terms he told the colonists that Tasmania was founded as a penal colony, that in emigrating there they had voluntarily surrendered their rights, and were neither entitled to object to the importation of convicts nor to the increased financial burdens. Failing to gain money from the Imperial Government, Sir Eardley Wilmot resolved on increased taxation, and met with opposi-

(15) Lord Durham: *Report on the State of Canada*, p. 241.

tion from the non-official members of the Council. The Governor resolved to force the estimates through, but the non-official members left the meeting, and reduced the number below the legal quorum. Then the "Patriotic Six" resigned. The whole colony supported them, the press rang with their praises, and thundered denunciations against any who accepted nomination in their place. The failure of the new convict system and the political turmoil roused the English Government to seek a scapegoat, and Sir Eardley Wilmot was recalled. Earl Grey became Secretary of State for the Colonies in 1846, and with his administration a better day dawned for the colonies. Sir William Denison, the successor to Sir Eardley Wilmot, was instructed to settle the dispute at his discretion, and eventually the "Patriotic Six" were reinstated. In 1847, Earl Grey, in answer to the insistent demands of the colonists to control their own affairs, said that he "had no wish to impose upon the inhabitants a "form of government not, in their judgment, suited to their "wants" (16).

So that the Australian colonists might be governed for their own benefit, in 1849 he called together the Committee of the Privy Council for Trade and Plantations to act as a deliberative body to frame a form of government for the Australian colonists. As a result, the "Act for the better govern-"ment of Her Majesty's Australian Colonies" passed the Imperial Parliament in 1850. By it the Port Phillip district was separated from New South Wales and erected into the colony of Victoria, and an improved system of government was established in all the Australian colonies. Tasmania, Victoria, and South Australia, were to come under the terms of the statute granted to New South Wales in 1842, that is, they were granted representative government, and, in addition, power was given to the Councils of the four colonies to change the form of government. The existing Legislature in Tasmania was to decide the number of members in the new Council, but it was limited to twenty-four. The new Council was empowered to make laws for the peace, order, and good government of the colony; to impose taxation, including the imposition of Customs duties; and to appropriate to the public service the whole of the revenue arising from taxes, duties, rates, and imports. Moreover, the Legislatures were entrusted "with the power of making any other amend-

(16) Parliamentary Papers, 1847, quoted by Egerton in *A Short History of British Colonial Policy.*

"ments in their own Constitution which time and experience "may show to be requisite." Power was thus given to the colonial legislatures to devise new constitutions with the assent of the British Government to be given after notice to the Imperial Parliament. Transportation was now the only bar to responsible government. Early in 1850, Lord Newcastle's despatch of the 14th of December, 1852, brought to the colonists of Tasmania the joyful news that transportation had ceased forever.

Before the end of 1854, the four colonies had made up their minds as to the forms of government they desired, and had sent Home bills for the Queen's assent. All but the Tasmanian Act came into conflict with Imperial enactments, and so required amending. The Queen declared her assent to the "Act to establish a Parliament in Van Diemen's Land "and to grant a civil list to Her Majesty" on the 1st day of May, 1855. Thus it came to pass that Tasmania was the first of the colonies to obtain responsible government; for it will be recalled that, by the Act of 1842, only representative government was acquired by New South Wales.

A FURTHER ACCOUNT OF THE GEOLOGY OF THE CATAMARAN COAL FIELD.

By

A. N. Lewis, *M.C.*, LL.M.

Part I.

(Read 17th November, 1927.)

GENERAL GEOLOGY OF AREA.

1. INTRODUCTORY.

Geology is to the miner what the Intelligence Service is to the soldier. It gives the plan of the terrain upon which the operations are based. In a general conception, it provides a guide for developmental policy, and in a special aspect it provides the tactical plan upon which each problem must be attacked. But the complete geology of a mining field is usually only apparent after fullest pure scientific research and practical investigation has been made, a result only achieved, if at all, when mining operations are concluded. Then the details of structure and the sequence of cause and effect may be known, and information of the greatest value to pure science and perhaps of economic value to those opening up other fields may be available.

But if geology is to be of practical use to the miner in opening up his own mine, it must supply its data in advance of operations. Its use is to tell the miner what his pick is going to strike. To do this, detailed knowledge of the whole stratigraphic province in which the field lies must be obtained. The geology of no 640-acre lease can be worked out within its boundaries, and even before an area is selected for a lease wide problems of policy must be considered. As a guide for all this, as accurate a mental picture of the whole district as can be obtained is vital.

The obtaining of this picture—this locality plan—entails such an amount of labour that in practice it must be built up gradually but to expend money without it is merely

Fig. 7. Nest of *Cyrtophora parnasia* (L. Koch).

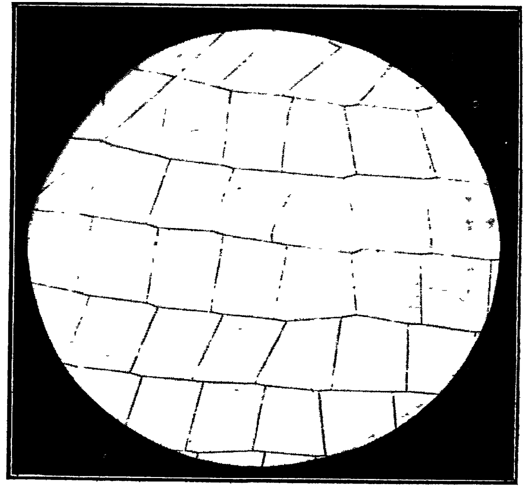

Fig. 8. Meshes in the web of *Cyrtophora parnasia* (L. Koch).

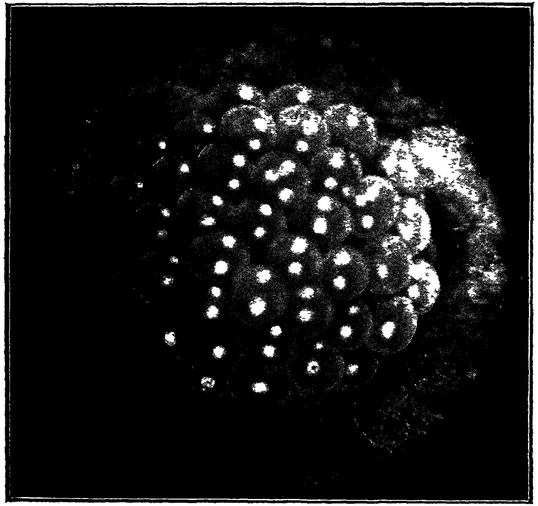

Fig. 9. Eggs of *Cyrtophora parnasia* (L. Koch).

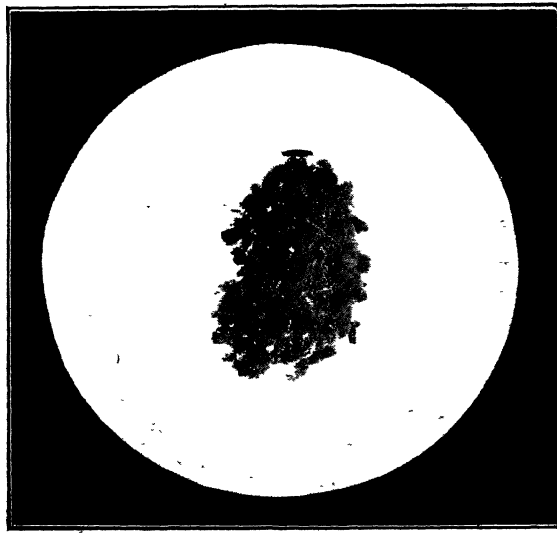

Fig. 10. Dark coloured tufts of silk on egg sac of *Cyrtophora parnasia* (L. Koch).

to repeat the tragic story of so many of the wrecks with which Tasmania is dotted. It is strange how many men who would never dream of building a house before their land was surveyed and marked will cheerfully spend thousands in opening a mine without the slightest idea of where they are or what is ahead of them. The story of money lost in Tasmanian mining has been largely the story of failure to recognise that a plan is necessary and that the Geologist can provide this plan.

Nowhere can these truths be better exemplified than in the past history of the Catamaran and other southern coal fields. The story of past efforts to open up these deposits has been a succession of chapters of blind expenditure of money without plan and of immediate resignation to fate on meeting difficulties which an appreciation of the geology of the area would have shown to be surmountable. Not only this, but when the importance of geology was recognised by the practical miner (Mr. E. C. Tregear must be given the credit for this on this field), its problems were insoluble until the telescope was used to aid the microscope—until the whole district was studied as one coal province.

Much has yet to be done before a complete geological map can be constructed. The difficulties of exploration cannot be imagined by anyone who has not attempted it, and even when all the surface data have been collected only boring operations can prove conclusions. But enough information is now to hand to warrant the construction of a "Policy Map," and it is well that this information be published as a guide to investigators in neighbouring and even distant fields, and to persons desiring to form a true estimate of the value of the field in question.

This paper aims at giving a general survey of our present knowledge. We cannot yet present a full detailed account of the geology of the field. The importance of this area has long been recognised and a wealth of literature has grown up about it, but since the last account was published so much information has come to hand from the boring and other exploratory activities of the Catamaran Collieries Ltd. and associated groups during the past three years, extended and co-ordinated by trips undertaken by the writer over the area in question and the surrounding districts, that it is necessary to recast our conception of the geology of the field and possible to make public a reasonably accurate general account of the geology of this portion of Tasmania.

2. PREVIOUS LITERATURE.

Attention is directed to the following articles on the area, and the reader is recommended to study them, as the information there set out is not repeated in this paper.

The first report of the existence of coal in the district is contained in the diary of Captain James Kelly dealing with his famous boat voyage round Tasmania. This navigator saw the seams of coal and carbonaceous shale outcropping in the cliffs bounding South Cape Bay, and referred to later in this paper.

In 1847 Joseph Milligan, who was brought from England by Sir John Franklin to report on coal in Van Diemen's Land, made a careful investigation of the area, and his report is to be found in the Papers and Proceedings of the Royal Society of Tasmania, 1848.

As the writer there remarks, coal had been mined at South Cape Bay many years previously to his visit.

In 1915 the late W. H. Twelvetrees made a survey of the Catamaran, Strathblane, and South Cape areas, and the results of his investigations are set out at length in Geological Survey of Tasmania Bulletins No. 20 (The Catamaran and Strathblane Coal Fields) and No. 24 (Reconnaissance of the Country between Recherche Bay and New River).

In 1921 Mr. A. McIntosh Reid continued the investigation, and his report is contained in *The Coal Resources of Tasmania*, chapter 7.

The area dealt with in the present paper adjoins that dealt with by myself in my account of the Mt. La Pérouse Range (Papers and Proceedings of the Royal Society of Tasmania, 1924, pp. 9-44), and may be considered as a continuation of the work there recorded.

3. GENERAL GEOLOGY.

(a) Physiography.

Looked at in detail, the physiography of this corner of Tasmania is most complicated, but in a general way it resolves itself into a coastal plain bounded on the east by D'Entrecasteaux Channel and on the west by the La Pérouse Range. Spurs descend from this range across the plain almost to the sea and divide it into a series of basins separated by rough and forest covered hills. The physiography of the western range has been fully described by the present

writer, and in this regard there is nothing further to add (see Lewis, 1924). The physiographical features of the rest of the area may be described in a few words.

About three miles south of the Lune valley a considerable spur runs eastward from Moonlight Flat. After a steep descent for several hundred feet, sufficiently sharp to define this spur from the general north and south trend of the main range, the spur rises into a considerable hill about 1,000 feet above sea level. This hill is succeeded, after a high saddle, by Sugarloaf Hill, the highest point on the spur (about 1,600 feet high), and standing some mile and a half from the edge of the main range and forming a bluff on the end of the spur. From this hill the spur drops in a series of steep, heavily wooded steps to the main road a mile or so farther east.

Between this spur and the Lune River lies a flat, even buttongrass plain, known as the Ida Bay Plain. This stands at an elevation of 100-300 feet above sea level, and from its southern and western edges the mountain spurs rise steeply. The land between the road and Southport Bluff is very little higher but somewhat seamed by small gullies and ridges thickly covered with low dense scrub.

The Sugarloaf spur is very narrow from north to south and drops quickly to the south to another basin—the Leprena Plain. This is a similar flat, regular, buttongrass plain about 250-350 feet above sea level through which runs the D'Entrecasteaux River and its several branches. To the north, the side of the Sugarloaf spur descends steeply. To the west, this plain merges into the D'Entrecasteaux cirques of La Pérouse. To the south-west, the ground rises steeply again to the Leillateah spur—an elevated saddle connecting Mt. Leillateah with the summit ridge of La Pérouse and terminating in a fine outstanding conical hill 2,630 feet above sea level, known as Leillateah [(1)]. The top of this peak stands some 4-5 miles back from the shore line of Recherche Bay. The country drops very steeply from the summit of Leillateah to the eastward, and after an almost sheer drop of 1,000 feet or so the spur is continued by a lower ridge

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(1) I have considered a change in the cartography as given in my La Perouse paper is necessary. This is the hill most commonly known locally as Leillateah. As this was the aboriginal name for Recherche Bay it appears more appropriate to keep the name for the mountain which absolutely dominates that bay and its settlements. In 1793 Captain John Hayes named the peak I previously called Leillateah, Pindar's Peak. This is the first and original name bestowed, and is very appropriate. I have, therefore, restored it. See also note P. and P. Royal Society of Tas., written in collaboration with myself.

which has a considerable extension southwards, projecting well into the Catamaran valley. This ridge also has a wall-like side to the east, and it is succeeded by a low line of wooded hills stretching to the shore line between Leprena and Catamaran. It is in these lower extremities of the Leillateah spur and their seaward basins that the Catamaran Colliery is now working.

In succession to the south comes the Catamaran Plain (2). This is another flat tract of ground some 150-250 feet above sea level and covered in this instance with cutting grass and low scrub. It lies almost entirely to the south of the Catamaran river which flows between it and the Leillateah spur, but the most convenient access to the plain is to be gained from the river. To the west, the plain merges into the Catamaran cirque and the slopes of the main La Pérouse range. To the south-west it is bounded by the sharply descending spurs of Pindar's Peak, which terminate in a fine outstanding and almost isolated hill known as Mt. Misery, which juts out a mile or more into the plain. To the east, the plain is separated from the shore by a range of broken dolerite ridges, about a mile broad and perhaps 600 feet high at their highest point. These run right down to the shore line between Catamaran and Cockle Creek and form, in the same line, the western boundary of Cockle Creek Plain. At roughly right angles to this line a similar line of hills skirts the northern shore of South Cape Bay and obviously a further plain to the southward has been flooded by more or less recent earth movements (see Twelvetrees, 1915 (ii.)). East of Cockle Creek Plain, which is under a mile wide, is a small area of elevated country around Bare Hill (909 feet) and extending to Whale Head.

(b) STRATIGRAPHY.

The stratigraphical succession of the rocks in this area presents few difficulties. The oldest rocks represented are Silurian quartzite conglomerates succeeded by limestones of the same age. The present writer has no further observations to add to those of Mr. Twelvetrees (Twelvetrees, 1915 (i.), pp. 8 and 33-37). In 1911 the present writer saw abundant fossils in the limestones near one of the Ida Bay Caves in the vicinity of the present quarry being worked for the Electrolytic Zinc Co. These corresponded with the series

(2) Mr. Twelvetrees called this Manuka Plain, but Catamaran Plain seems to be generally employed locally, and there are sufficient "Manuka Plains" scattered round Tasmania.

illustrated in R. M. Johnston's Geology as Silurian. Some doubt has since risen as to the correct age of these beds, but for the present there appears to be no reason for changing Johnston's determination.

The quartzite conglomerate boulders extend right across the western edge of the D'Entrecasteaux plain, and disappear under talus and soil at the foot of Leillateah at an elevation of 500 feet but beds lying *in situ* have not yet been found. In the valley of the D'Entrecasteaux they apparently are to be seen as low as 300 feet above sea level but have been here obviously much eroded. The limestone which occurs above them and forms the upper two-thirds of Sugarloaf Hill does not extend across the valley. There appears to be a marked unconformity between the conglomerate and the limestones, the former covering more than twice the area of country covered by the latter and being succeeded towards the south by Permo-Carboniferous and Triassic sediments without the interposition of the limestones. However, in the time at the writer's disposal no clear junction section between the conglomerate and either the limestones or more recent sediments could be found. The occurrence in the D'Entrecasteaux plain is marked by accumulations of great boulders evidently eroded *in situ* and no positive occurrence of the parent beds could be found although almost certainly they occur at no great depth below the surface detritus and soil of the hill sides.

The coast line of the area is most indented. Southport, with its inner and outer harbours to the north, Southport lagoon in the centre, the double indentation of Recherche Bay towards the south cut deeply into the coastal plain. These are all typically submerged river mouths, the sea following the extremities of the steep sided valleys in tortuous arms. The coast is mostly low but rocky. There are occasional sandy beaches but great masses of dolerite boulders and low cliffs of the same rock occupy the shore line for most of its extent. South Cape Bay and South-East Cape show more rugged features, but even here the cliffs seldom stand a hundred feet high. The whole coast is marked by innumerable reefs, submerged rocks, and islets, and presents a constant series of perils to navigation.

From occasional boulders in the Catamaran River, to be found with increasing frequency from three miles above its mouth, limestones of this age may outcrop in the valley of this river, but these boulders are probably derived from Permo-Carboniferous limestone beds known to occur there.

However, the fact of the occurrence of similar beds at Sugarloaf Hill and on the south coast (see Twelvetrees, 1915 (ii.)) gives an indication that possibly there may be an outcrop of this rock in the valley of the Catamaran River, but the writer has been able to find no such outcrop and is of the opinion that none occurs.

Next in succession come the marine sediments of Permo-Carboniferous age. These are common round Southport and extend high on to the flanks of the La Pérouse range south of the Lune valley and outcrop again on the coast near South Cape. They outcrop in the valley of the Catamaran River in cliffs on the S.E. face of the broad hill east of Leillateah about 2 miles S.W. of the mine workings. These are continued to the S.E. by glacial basal conglomerates. The dip would account for the appearance of these rocks below the Triassic sediments. The zones represented appear to correspond with the basal conglomerates and lower marine series as described from other parts of Tasmania. They are exposed only where the combined action of faulting, river and cirque erosion has permitted gorges to be cut deep enough into the heart of the mountains. A few occurrences of lower marine limestones are to be found on the western edge of the Leprena Plain, and succeed the glacial conglomerates in the Catamaran valley.

Ross sandstone of the lower Triassic has not yet been definitely located in the area. It should succeed the Permo-Carboniferous rocks where they occur, and appears to do so on the north-east edge of Moonlight Flat at about 2,000 feet above sea level. However, this assumption is tentative, and the coal measures appear to descend to 500 feet or thereabouts farther south. A determination of these beds is very important as they mark the lowest known limit of the upper coal measures. Any one engaged in exploration for coal should be acquainted with their general characteristics, although it is often difficult to distinguish them from sandstone beds included in the coal measures, and the present writer is by no means satisfied that he has not so confused beds of sandstone on the higher slopes of La Pérouse (Lewis, 1924). Composition is not a certain criterion as, although the Ross sandstones are predominantly quartzitic and the coal measure sandstones predominantly felspathic, these features are by no means absolutely constant. In many layers it is difficult to tell which constituent predominates, and layers of purely quartzitic sandstone are frequent in some beds of coal measures. But Ross sandstones can usually be dis-

tinguished by a massiveness seldom seen in the coal measures and by a more regular and deeper colouring and the frequency of cross bedding, which can only be seen well in massively bedded strata. It is, however, most probable that Ross sandstones will be ultimately identified in the area.

Succeeding the Ross sandstones naturally come the felspathic sandstones containing the coal measures. Nowhere on this field has the base of this series been observed, and one of the most urgent pieces of work to be undertaken is this locating of the junction of the economic beds with some underlying series. Until this is done definite knowledge of the stratigraphical position of the exposed beds in the system is difficult to obtain. The coal measures have been somewhat fully described (see Twelvetrees, 1915 (I.), and Reid, 1922) but much work remains to be done.

It would be useful to know what is the relation between the coal bearing beds to the underlying Permo-Carboniferous or Triassic sediments. The solution of this problem should give an indication of their stratigraphical position in the Triassic period—a point of vital importance in the correlation of neighbouring beds. The La Pérouse section will give this and its solution is only a matter of exploring the face of the mountain.

The fossil evidence is abundant and deserves the closest study. By this means, perhaps, many difficulties will be solved, and the whole field zoned. The coal measure fossils have never been sufficiently studied in Tasmania. Species have been identified and thanks to Dr. Walkom (Walkom, 1924, 1925), sufficient is now known of the classification of the Mesozoic flora, but little has been done in the way of studying the field occurrences. To date—beyond a certain vague empirical grouping the details of which rest in the minds of Mr. A. M. Reid and Mr. P. B. Nye—all these fossils are grouped together as Mesozoic species. What is wanted is information as to whether any one or more species or any constant groupings are typical of any particular beds in the coal measures. Detailed research in this branch may provide a key which would solve many difficulties. It is hoped that this matter will be undertaken as opportunity presents itself.

The two shafts now sunk by the Catamaran Colliery Co. have opened up fine fossil beds and some opportunity has been thus afforded to study in detail the relationships of at least two coal seams occurring in the locality. One of these fossil beds lies immediately over what is termed in the mine the shaft seam, and the other immediately underlies what is

known as the anthracite seam. The fossils in both cases are wonderfully abundant and remarkably well preserved, and warrant the closest study. The writer hopes to record further conclusions on this topic in a future paper.

The shaft seam is characterised by absolutely predominant *Johnstonia coreacea*, accompanied by rarer *Thinnfeldia odontopteroides*, *T. feistelmantelli*, *Cladophlebis australis*, and *C. tasmanica* (perhaps with *Phlebopteris alethopteroides*) and with very rare *Phœnicopsis elongatus* and *Linguifolium diemenense.*

The anthracite seam is characterised by plentiful *Cladophlebis australis* and *Phœnicopsis elongatus* with rarer *Johnstonia coreacea*, *Thinnfeldia*, and *Linguifolium.*

The result of these observations will make it easy to verify the relationship of other seams with these.

The fossils underlying the anthracite are easily traceable in the lower bands of the coal itself. This does not occur in the case of the shaft seam. It is easy to see that such would be more probable with a band of fossils underlying a seam than with one overlying the coal.

Speaking generally, the fossil evidence finally and definitely terminates any idea that these are not typical Triassic measures. It was thought vaguely possible by the mine staff that the quality of the coal was evidence of a different horizon, and the existence of earlier measures at Ida Bay lent colour to this theory. But the Catamaran coal measures are typically Triassic and the grouping of the fossils corresponds most closely with that given by R. M. Johnston for Mount Nicholas.

I must here mention a further point. In 1893 R. M. Johnston gave his opinion that the Ida Bay coal seam was lower than the Upper Mesozoic measures. He says:—"It "would seem probable, therefore, that the Southport and "Ida Bay formations supply an important link in the chain "of plant life, connecting the close of the Permo-Carbonifer-"ous period with the beginnings of the Mesozoic period," and in the accompanying table he puts these beds between the Adventure Bay bed and what we now know as the Ross sandstones. (Johnston, 1893.) Mr. Reid adopts this view. (Reid, 1922.)

I desire to express the opinion that the discovery of Vertebraria must be conclusive. No examples of this plant are to be found associated with the Catamaran seams and they cannot be lightly tossed aside. The Ida Bay seam is not now approachable to check observations, but personally

I have never found R. M. Johnston in error in a direct observation. We must, therefore, support his determination of the stratigraphical position of the Ida Bay seam.

The next event in the geological succession was the intrusion of the dolerite (diabase), and the solution of the problem of these intrusions is the most important piece of economic geology to be undertaken in the area—if not in all Tasmania. As Mr. Twelvetrees has said:—"The Geological "mode of occurrence of this rock has long been a subject of "controversy but it must be correctly understood before the "prospects of coal fields can be gauged." He then proceeds to elaborate his theory of its occurrence (Twelvetrees, 1915 (i.), p. 18). The importance of this object of research is so great that all Tasmanian Geologists have made some contribution towards its solution, but unfortunately with widely conflicting results. The present writer has summarised his views in a recent paper (Lewis, 1926), views which are strongly supported by evidence collected in this area, and although it is too much to hope that these will be the last word on the subject, it is sincerely hoped that they are based on a correct appreciation of the field evidence and will in due course be confirmed by others.

The occurrences in this locality may be grouped into (1) the coastal dolerite, (2) the Catamaran sill, (3) the La Pérouse dykes and sills.

(1) *The Coastal Dolerite.*

This mass extends from South-East Cape northerly along the shore of D'Entrecasteaux Channel past Recherche Bay to Southport and is evidently closely connected with occurrences farther north.

It forms Bare Hill and the promontory between Recherche Bay and South-East Cape, and also underlies Cockle Creek Plain and forms the line of hills extending for about a mile west of this plain and running northward to the valley of the Catamaran River. The settlements of Catamaran and Leprena are built on it, and it forms the several capes along the western side of Recherche Bay and the occurrences north of Sullivan's Point and south of Southport. It is, even in hand specimens, of a characteristic coarse grained holocrystalline structure with frequent veins of gabbroid nature and is relatively hard and massive and free from cracks and secondary crystalline minerals. It appears to be a typical

transgressive mass of unknown depth and definitely limits the coal-bearing strata to the eastward, except to the east of Recherche Bay and towards Southport Lagoon.

(2) *The Catamaran Sill.*

This occurrence of igneous rock is the one which has caused the trouble on the mining field and in the bores, and its isolation is the most useful piece of pure geology to be worked out on the field. At its southern extremity this outcrops as a dyke-like mass at Little Island in South Cape Bay and there has been fully described (Milligan, 1849, and Twelvetrees, 1915 (ii.)). A clear section can there be seen in the cliff face. It is apparent that this body of igneous rock rose as a dyke with a well defined wall-like eastern edge. It is here about 100 yards wide and of unascertainable depth. Farther west it appears to arch over sedimentary deposits which are exposed on the beach and after about 100 yards to descend to sea level again and continue thus for about 50 yards—probably this is a local coalescence of two dyke-like masses ascending in close proximity to each other. The dyke proper is thus about 250 yards wide. It then assumes the form of a sill commencing to the east with a thickness of about 200 feet and rapidly thinning to about 50 feet and gradually feathering out some 400 yards or so from the dyke.

Coal definitely exists under the sill and continues right to the edge of the dyke. It was mined some years prior to 1848 and the entrance to the old tunnel mentioned by Dr. Milligan (Milligan, 1849, p. 22) is still visible. This coal seam is definitely under the sill. Mr. Twelvetrees made a curious mistake when he ridiculed the shaft sunk here (Twelvetrees, 1915 (ii.), p. 7), and his error can only be accounted for by supposing that he did not descend the cliffs. On the cliff face referred to the coal was mined by a shaft under the "diabase" and not only "to people of that day" but to a geologist of to-day "would it be the most natural thing "to suppose that by sinking through the diabase rock coal "would be reached below." Since it can be seen that the diabase is only 50 feet in thickness and coal lies not 50 feet below it.

The coal measures and seams have not been metamorphosed for more than a few inches—extending to a few feet locally—and beyond a slight alteration in angle of dip, perhaps due to faulting, the sedimentary beds have been barely disturbed by the igneous intrusion. This only bears out observations made in many places in Tasmania that neither

extensive alteration nor dislocation necessarily follows these intrusions. This occurrence is definitely intrusive and of a later age than the sedimentary series.

The Rocky Boat Harbour track crosses the junction between the igneous rock and the sandstones, about half a mile inland. The edge of the igneous rock was located as accurately as possible, and a bearing was taken from this edge to the edge of the occurrence at Little Island. This gave a reading of roughly 40° E. of mag. N., and when it was plotted on a chart the result gave a line through the eastern edge of the occurrence in the Catamaran field and of that to the west of Leprena with such a degree of accuracy—allowing for minor irregularities in the edge of the sill—that the interpretation was forced on the writer that this occurrence represents the outcrop of a fairly regular sill, a little broken, perhaps, by subsequent faulting.

The eastern edge is a roughly regular outcrop, and the sill then feathers out to the westward through the coal measures, rapidly decreasing in thickness and varying in its westward extension. Bore results give the authority for this statement. This sill has been cut with faults. The two dolerite hills—one behind the hill seam and one on the south coast—are uplifted portions of it and apparently in present evidence coal measures extend below the igneous rock. The outcrop is very irregular, being a succession of sharp rises separated by curved saddles. At the coast the top of the sill descends to sea level, but much may have been removed by erosion. It then rises quickly to about 400 feet and forms the backbone of Coal Hill. A mile or so inland it rises into a pointed conical hill capped with boulders and almost bare of trees, clearly visible from Cockle Creek Plain and Catamaran Plain, and the only hill in the vicinity not densely covered with forest. This hill must be between 800 and 1,000 feet in height.

The surface of the sill then drops quickly down below 200 feet, and passes under the Catamaran Plain, appearing at the surface toward the eastern edge of this feature, although here it becomes confused with the coastal dolerite. It passes under the coal measures of the Catamaran basin, emerging at about 280 feet in a tiny outcrop just west of the anthracite outcrop here and again at 400 feet as the top of the hill at the back of the hill seam. It then passes under the sedimentary rocks of the Leprena Plain and is cut by the D'Entrecasteaux River at about 150 feet above sea level about

a mile west of Leprena. Farther north it has not yet been investigated, but the basalt occurrences between Leprena and Ida Bay appear curiously to be in the same general line.

In the nature of the texture of the rock this sill is immediately distinguishable from the coastal dolerite. It is of the closest grain, without crystals apparent to the naked eye, and it is seamed with cracks and zoolite veins. Its structure is constant throughout its surface occurrence and its depth as far as explored by bores and on the coast. According to strict petrological classification it is a basalt, and it is often so called by the miners locally who invariably distinguish it from the coastal dolerite. Milligan called it "basalt" and distinguished it from his "greenstone" of the Whale Head occurrence. Mr. Twelvetrees did not distinguish it from his generic diabase. It is—from observations of hand specimens—similar to the chilled-margin rock of dolerite intrusions elsewhere and is to be tentatively grouped with the Mesozoic intrusions. It is easily distinguishable from the olivine basalt occuring north of Leprena. But it is so obviously a different rock from the normal dolerite, that a separate name should distinguish it. The fact that these intrusions have been grouped under the name of "diabase" (dolerite) and the Tertiary flows as "basalt" should not obscure the fact that this is a true "normal basalt," although presumably of Mesozoic age. To avoid confusion with the olivine basalt and in respect to usage the writer suggests the name "Basa-dolerite." Its correlation with other dolerite intrusions must be determined in the future.

This occurrence exercises a controlling influence on the economic coal measures and study and mapping of its outcrop and extensions are of vital importance to a knowledge of the field. For the present it seems that, although it cuts right through the field and will in the future be a source of trouble, it by no means limits the area of possible coal-bearing strata. The width of the outcrop appears to be only some 200-400 yards and westward extensions appear to be in the nature of sills. On the coast unaltered coal exists beneath this sill which feathers out in a few hundred yards. There appears to be no reason to fear the rock in the coal field. Probably it only interrupts the coal for a few hundred yards, if at all, and elsewhere overlies and underlies seams. There seems to be little doubt that the shaft seam dips under the sill and the anthracite overlies it. Only mining operations will show whether the seams have been materially affected. In any case there must be several miles of possible coal-

bearing country between this occurrence and the mountain ranges although the possibility of other dykes and sills must be considered. Contacts between the dyke and the coastal dolerite should be searched for carefully and may yield valuable information, and any possible relation between it and the Tertiary olivine basalt to the north should be studied.

(3) *The La Pérouse Dykes and Sills.*

This occurrence has been fully described (Lewis, 1924), and there is little new information to add. Leillateah is capped by a mere 50 feet of dolerite—a fragment of an eastward feather edge from the La Pérouse dyke. This sill has been eroded away between Leillateah and the dolerite peak immediately east of La Pérouse, and everywhere coal measure sandstones may be seen protruding from below it. The main dyke across the front of the mountain seems to be over 2,000 feet in depth in the vicinity of the Hippopotamus—although it is not 400 yards in horizontal width. This may be a zone of up-welling of the original magma.

South Cape Range and the dolerite hills behind it appear to be portion of the same occurrence as that of Pindar's Peak (the Leillateah of my previous paper) and to extend from the summit in a roughly south-easterly direction—the difference in elevation being due to tectonic faulting.

The rock under La Pérouse and in the sills and dykes exposed in that mountain corresponds in texture with that of the Catamaran sill described above, while that of Pindar's Peak is typical holocrystalline dolerite. All the present evidence points to a possible correlation between the La Pérouse sill and the Catamaran sill, the sills having been broken by a fault of about 3,500 feet.

The writer cannot stress too strongly the view advanced in his previous paper that the slopes—both eastern and western—of the La Pérouse range present such remarkable sections that they cannot be neglected by those interested in practical mining in this field. Further study on these slopes is one of the urgent necessities as a preliminary to a thorough understanding of the coal measures.

Continuing the geological history of the area, the next rocks in succession are the Tertiary olivine basalts, but their exact age is not yet definitely established. These rocks occur at Leprena—astride the loco-railway line, and extend for

about 500 yards westward. Metamorphic contact with shales is apparent from scattered surface pebbles. Then come many small deposits of sediments of a more or less modern age. Mr. Twelvetrees groups these sediments as Tertiary and Quaternary. The present writer is of the opinion that the sand dunes on the seaward half of Cockle Creek Plain are of recent age, and the remaining sediments belong to the Pleistocene and represent glacio-fluviatile deposits from glaciers during the period of maximum flow as the ice melted. Leprena Plain and the country between that settlement and Southport Lagoon is covered with such deposits, but they do not appear to be exactly morainal.

Further research necessitates a recasting of the views expressed in the writer's previous paper (Lewis, 1924, p. 43) on the subject of the extension of the Pleistocene glaciers in this area. Erratics of Triassic grits and conglomerates from summit of ranges are definitely to be found on Leprena Plain, e.g., about 1 mile east of shed at end of railway line, that is near eastern boundary of plain and about 300 feet above sea level.

Further, several ridges composed of a jumble of angular blocks of dolerite, sandstone, and quartzite conglomerate occur, notably about half a mile south of the end of the southern branch of the new Leprena mill tram line, and this plain was definitely under ice during one phase of the glacial epoch. It is now covered with morainal till and outwash apron deposits. The "rubbishy mixture" referred to by Milligan on the south coast is due to land slips and not to ice action.

The Catamaran Plain is relatively free from sediments, but between Recherche Bay and the workings at Catamaran recent deposits abound. However, these appear to be due to surface erosion and great accumulations banked up by frequent changes by the Catamaran River in its course. The boulders have given trouble in some of the bores, although I am not sure that some of these are not glacial or glacio-fluviatile. Accumulation of quartz pebbles have been derived from weathering of Trias-Jura grits on mountain range. Sometimes these are quite angular, but usually water worn. Their arrangement shows alternation of flood and slack waters. They occur in both valleys. No evidence could be found of raised beaches or invasion of the land by the sea in Tertiary or Quaternary times.

4. HISTORICAL SEQUENCE OF THE DEVELOPMENT OF THE PRESENT TOPOGRAPHY.

Physiography is too often regarded as an elementary branch of geology and of little practical importance. No greater mistake could be made. The physiography of a region, correctly interpreted, provides a key to earth movements, and the results of these in turn, when accurately plotted, indicate the whereabouts of any beds the miner desires to locate. Especially is this so in the case of Tasmanian coal measures, since time has not yet effaced the influence of subsequent earth movements on the present topography.

The present writer has already elaborated his views on the development of the main features of Tasmanian topography (Lewis, 1924, pp. 27-31, and Lewis, 1926), and there is no occasion to repeat these opinions. The further study of the area has only confirmed the succession of events set out previously. It is not necessary to quote all the examples which have come to light.

As suggested above, research into the geographical conditions during the deposition of the coal measures would well repay investigation, but one point is certain—the very long Permo-Carboniferous-Triassic period of sedimentation came to an abrupt end, and in this field the top of the coal measures appears to have been lost by subsequent erosion. Earth movements raising the level of the land were probably responsible, and these were followed from isostatic causes by the dolerite intrusions. It seems at present that at any rate the coastal dolerite and the Catamaran sill are different intrusions. No evidence is yet forthcoming as to which was the earlier, but the writer suggests that the Catamaran sill is a true example of an intrusion of chilled-margin magma following a tectonic fault and that the coastal dolerite is either the top of the magma which has stoped its way upwards or been injected at a later stage when crystallisation had proceeded much farther. The La Pérouse occurrence is more difficult to interpret but probably may be grouped in much the same way as these other occurrences.

The absence of Tertiary sediments indicates sub-aerial conditions during that long period and that this area has not been below the sea since Jurassic times. The fact that these very soft coal measures have not been eroded in the very long interval since their deposition in spite of the absence of covering indicates that they have rested stably not very much above sea level since their original elevation.

For the reasons given previously it appears certain that the La Pérouse range and the mountains to the north are the results of block faulting and the main outline is due to what the writer has termed "late Tertiary tectonic faulting." The date appears to be immediately pre-glacial.

Further research is necessary before the actual relation of the Sugarloaf spur to the remaining country can be satisfactorily explained. It is safe to presume that the limestone stands stratigraphically some 6,000-8,000 feet below the coal measures of the Leprena Plain. To-day it stands topographically 1,000 feet higher than these beds. It appears so out of place in its surroundings that its position may be due to pre-coal measure faulting and the coal measures may abut against it. Whether this is so or not warrants investigation as throwing important light on the economically possible limestone reserves.

The removal of the limestones over the quartzite conglomerates of the Leprena Plain was effected prior to the uplift of the La Pérouse Range, as the post-faulting erosion here has done little more than remove the overlying coal measures in the D'Entrecasteaux valley. If, as appears to be the case, the coal measures of Leillateah are proved to overlie this quartzite without the intervention of the Permo-Carboniferous and Ross sandstones series, a fact will come to light with a very interesting bearing on the tectonics of the sedimentation period. Namely, that through the earlier period these Silurian rocks stood out as an island. Later as the mass sank into its magmatic foundation it was submerged below the coal measure lagoons, etc., giving proof to the assumption of a landsurface remaining at the same level, while some 5,000 feet of sediments were deposited on the basal rock gradually sinking in response to added weight.

D'Entrecasteaux Channel must be regarded as a flooded portion of the coastal plain. Soundings show that the same general features are produced below the water as exist on the plains near the coast. A fault line may govern the coast, but it would be of no magnitude when compared with the great tectonic faults five miles inland. Recherche Bay and Southport are the flooded mouths of the rivers now emptying into those estuaries and the older courses of these rivers are clearly shown by the soundings (see Reid, 1922, Plate XXII.). A post glacial rise in sea level of under 100 feet would explain all the coast features. There appears to be no evidence of ocillation of strand level or of Quaternary land movements.

South Cape Bay out to the Eddystone and Pedra Branca must be considered a submerged portion of Tasmania as Mr. Twelvetrees states. The topography of this portion is probably governed by a fault running roughly east and west —probably through a point about two miles south of Cockle Creek. The submerged portion represents a plain similar to the Leprena and Catamaran Plains, and the range of high hills fringing the coast from Coal Hill to Cockle Creek Plain appears to correspond to the Sugarloaf and Leillateah spurs. The line of rocks and reefs from the Mewstone to Pedra Branca and Eddystone may represent a further spur to the south, and South Cape Range seems to be a portion of the Pindar's Peak dolerite intrusion dropped by this great block fault. Sea erosion of the soft sedimentary rocks has been rapid since the submergence of this block and has been responsible for minor details of the coast line at South Cape Bay. This agency is scarcely felt in the sheltered waters of the Channel.

Cockle Creek Plain, Bare Hill, and the rough country towards Whale's Head are a separate feature. Here the coastal dolerite is highest and widest. Bare Hill seems to be merely a residual of dolerite exposed by erosion. In spite of diligent search no evidence could be found of a marine invasion of Cockle Creek Plain as suggested by Mr. Twelvetrees. Cockle Creek Plain presents superficial resemblance to a glacial valley, but no grounds could be found for assuming that it was ever under ice. Again the gradual rise to the south coast, and the abrupt drops there to the beach and the nature of the coast make it difficult to believe that this area could have been elevated by a recent minor block fault and supports the following theory, viz., that it is the valley of an ancient river which drained the now submerged plain to the southward, and of which the South Cape Rivulet may have been a considerable branch. This old river has been destroyed by the South Coast fault already described, and its whole drainage captured by the submerging of its basin and the subsequent northward erosion of the sea. The valley between Cox's Bight and Port Davey is susceptible of a similar explanation.

We now come to a consideration of the origin of the Leprena and Catamaran Plains and the intervening Leillateah Spur—the vital area from an economic standpoint. There seems to be no doubt that the Leillateah Spur is the result, at least, as far west as the north and south ridge half a mile or so east of the summit of Leillateah, of a series of faults

at an angle to the main line of break that gives the mountain range its outline. This ridge has been part of the uplifted block, and this has protected the country between it and the sea from erosion sufficiently to form the divide between the D'Entrecasteaux and Catamaran Rivers. In addition it seems that a fault runs along the eastern portion of this ridge forming a break between two great blocks of country. Hill Seam ridge presents a more or less gentle escarpment 300-400 feet high on the south-eastern slope and a sharp escarpment of over 600 feet on the side of the Leprena Plain to the north-west. The ridge itself is isolated by a double fault—an east and west elevated block and a fault separating it from both plains. The Leprena block is a separate feature. The ridge is to some extent protected by a portion of a dolerite cap. This seems to be continued on the summit of Leillateah, some 2,000 feet high, and a mile or so farther west. In general, this ridge appears to be a portion of the Leillateah Spur separated from that feature by block faulting.

Another equally plausible theory is that the Catamaran Plains and shaft block have dropped as a result of tensional stresses from the Leprena Plains and Hill Seam block. This view is supported by the dip of the strata which in the Leprena Plain block appears to be to the north-west and in the Catamaran Plain block to the north-east with a break near the eastern boundary and farther east a dip to the west indicating a drag against the coastal dolerite as this block sank.

The Catamaran Plain and the Leprena Plain have very likely been considerably extended by erosion subsequent to the faulting, but this does not affect the general proposition as to their ultimate origin. The existence or otherwise of these controlling faults must exercise a vital influence on the policy of mining in the district.

The great La Pérouse tectonic fault as modified by these Leillateah deviations bounds the two basins to the west. The uplift of the mountain block was probably gradual and streams flowing in pre-existing valleys continued their courses until they reached the edge of the scarp. Here they cut great gorges, and later resumed more or less their original course across the unaffected blocks of the plains. To the seaward side of these plains occurs the belt of dolerite already described. This has presented a hard bar at the mouths of the streams and has materially contributed to the preservation of the soft coal measures behind although the low level of these is their greatest protection.

The history of the basins since the period of major block faulting has been a very slight and gradual erosion of the sedimentary beds behind the coastal dolerite as the rivers have cut down through this hard bar. Tributaries have been pushed behind it and their erosion has caused the dolerite to stand out in a series of ridges.

As has already been indicated, ice extended for considerable distances beyond the mountain névés during at least the maximum period of Pleistocene Glaciation. The discovery of moraines and erratics at 300 feet above sea level on the Leprena Plain indicates the possibility that ice reached sea level in South-Western Tasmania. To-day the rainfall at Catamaran averages 60 inches. It is infinitely higher at Port Davey. It seems to the writer, therefore, to be a reasonable assumption that during the Pleistocene glacial epoch there was an extension of ice in South-Western Tasmania to a greater extent than elsewhere, and that absence of definite moraines is no ground for stating otherwise.

Finally, the sequence of rise and fall of strand level during post-glacial times presents problems of great interest. Professor Sir Edgeworth David has called attention to the erosion of troughs by streams in glaciated valleys on the West Coast (David, 1926), and the same features are observable, although not so well marked in this area. Every river crossing a button-grass plain has entrenched itself. This is most strongly marked in the case of the Catamaran which even enters the sea between two moles, the remnants of a dolerite spur into which it has cut its channel. For over five miles this river flows in a winding course between cliffs from twenty to fifty feet high cut in the coal measures on the northern side of the Catamaran Plain. Similarly, the D'Entrecasteaux River flows in a trough not quite so marked or so persistent as that of the Catamaran but otherwise very similar and also on the north side of the Leprena Plain. The Lune does the same on the north side of the Ida Bay Plain.

This at first sight suggests a rise of the land but no raised beaches are discoverable with the one exception of this finest example of a shore platform the writer has ever seen. This lies on the east centre quarter of South Cape Bay and runs over a hundred yards out from the cliffs. It has been eroded out of soft horizontal coal measures, and stands at about high water mark. It appears to the writer to represent a recent slight rise of strand level to the extent of not more than ten feet. On the other hand, the mouths of every

river have been flooded by the recent rise of the sea, and the discovery in the Catamaran mine and neighbouring bores of several old courses of the Catamaran River adds further difficulties.

The explanations suggested by Sir Edgeworth David in regard to the Strahan district appear, however, to be confirmed in this area. A slight recovery of the land on the melting of the ice, exceeding in rapidity the recovery of the waters of the ocean, seems to be the reasonable explanation. To this must be added the increase in degree of slope given by submergence of land surface to the east and south. The dry valley of Cockle Creek indicates that the submergence took place in the very recent past and the topography of the valleys of the Catamaran, D'Entrecasteaux and Lune point to its having occurred when the plains were under ice. Thus, these rivers have been able to deepen their beds to an extent beyond all proportion to the time such a process would normally have taken.

5. THE LA PEROUSE RANGES AS A SOURCE OF HYDRO-ELECTRIC SUPPLY.

The writer professes no qualifications as a civil engineer beyond those given by common sense and a knowledge of the terrain in question. On the La Pérouse Range, especially on the spur running south-east from Pindar's Peak (the Leillateah of the writer's former paper), there exist high level glacial lakes. There are small catchment areas, good sites for storage dams at a high elevation, an enormous rainfall, and from 1,000 to 2,000 feet drop, according to the location of the various portions of the scheme. The problem is whether sufficient storage could be obtained at an economically possible outlay to tide over the maximum possible rainless period. As to this the writer can only give some observations, and detailed investigations by a qualified engineer would be necessary before the slightest considerations could be given to the possibilities of such a scheme.

First, as to rainfall—no data exist as to this and it would be as well to start a series of readings at least at Catamaran with a view to possible future developments. If the rainfall in Catamaran is 70 inches—which seems to be a fair estimate—the rainfall on the La Pérouse ranges should be in the vicinity of 100 inches, with an average maximum period without rain of 21 days.

Lake Margaret with a watershed of 7 square miles, average storage head of 16 feet, static head of 1,100 feet, and average annual rainfall of 150 inches develops an 8,000 horse-power. The La Pérouse range should provide a simple scheme with a watershed of 2 square miles and a more extensive costly scheme with a watershed up to 4 square miles. The storage head could be developed to any economic height. It should prove easy to obtain a static head of from 1,500 to 2,000 feet and the average annual rainfall may prove equal to that at Lake Margaret. It is probable that 2,000 horse-power could be developed, but the question of costs may make such a scheme impracticable. It is certain that a scheme would be far more costly here than at Lake Margaret as the natural facilities are inferior.

Should La Pérouse ever be considered, the writer's outline suggestion for a scheme is: (1) A storage dam across the branch of South Cape Rivulet which drains the lakes south-east of Pindar's Peak; (2) the water to be drawn thence to a service reservoir at the site of the lake above the Catamaran Valley to the north of the lakes above referred to; (3) open courses to be run round the side of the Catamaran Cirque to the lakes at its head and so augment the supply by tapping these streams—this may be carried round the south-eastern face of La Pérouse but probably the results would not warrant the very high costs of this work; (4) the water to be drawn from this reservoir down a straight drop to a power station in the Catamaran Valley.

An alternative scheme would be to utilise the Picton Valley as a site for the power station and obtain the benefit of the larger catchment area—including the Reservoir Lakes —which is available on this site.

The writer would not have broached this topic had it not been freely discussed as a possibility by the Catamaran Mine Staff. The writer's own opinion is that it would be far more economical to bring the power from a larger scale scheme and that any possibility of a scheme in the La Pérouse ranges is prohibited by the smallness of the catchment areas and the heavy overhead cost which would be placed on any small scheme. This opinion, however, can only be confirmed by a competent engineer. A point that must always be borne in mind in such an investigation is that any possible site for a dam in this locality is highly glaciated. This gives frequent rock bars—as at Lake Margaret—which make excellent foundations for any works, but the country is littered with moraines, which are impossible as a foundation for anything of weight.

APPENDIX.

List of Works referred to in the Text.

David, Sir T. W. E. 1926. Pleistocene Glaciation near Strahan, Tasmania. Report A.A.A.S., Vol. 17, pp. 91-103, 1924.

Johnston, R. M. 1893. Further Contributions to the Fossil Flora of Tasmania. P. and P. Royal Society of Tas., 1893, p. 170.

Lewis, A. N. 1924. Notes on a Geological Reconnaissance of the Mt. La Pérouse Range, P. & P. Royal Society of Tas., 1924, pp. 9-44.

1926. The Isostatic Background of Tasmanian Physiography, P. & P. Royal Soc. of Tas., 1926.

Milligan, Joseph. 1848. Report on the occurrence of coal at Southport and South Cape Bay, P. & P. Royal Soc. of Tas., 1848.

Reid, A. McIntosh. 1922. Coal Resources of Tasmania, Ch. 7. Mineral Resources Paper No. 7.

Twelvetrees, W. H. 1915 (i.) The Catamaran and Strathblane Coal Fields, Geol. Survey Bulletin No. 20.

1915 (ii.). Reconnaissance of the country between Recherche Bay and New River, Geol. Survey Bulletin No. 24.

THE ROYAL SOCIETY OF TASMANIA

ABSTRACT OF PROCEEDINGS

1927.

28th February, 1927.

Annual Meeting.

The Annual Meeting was held on the 28th February at the Royal Society's Rooms, The Tasmanian Museum, Hobart, the President of the Society, His Excellency Sir James O'Grady, K.C.M.G., presiding.

The Annual Report was read and adopted. The following were elected members of the Council for 1927:—Dr. A. H. Clarke, Mr. W. H. Clemes, Dr. W. E. L. Crowther, Mr. W. H. Cummins, Major L. F. Giblin, Mr. J. A. Johnson, Mr. A. N. Lewis, Mr. E. E. Unwin, and Mr. C. E. Lord (*ex officio*).

Mr. Walter E. Taylor was elected auditor.

The following members were elected:—Messrs. T. H. Atkinson, G. L. Barnes, S. G. Cooper, W. T. Gellibrand, C. L. Gillies, H. A. Gruin, Colin Kennedy, Dr. Arthur Giblin, Messrs. C. S. King, E. R. Kirby, R. W. Koch, Miss V. E. Mace, Messrs. C. Macfarlane, A. Mathers, Mrs. Meredith, Mr. C. J. Penman, Rev. F. V. Pratt, Miss M. Smith, Messrs. R. S. Russell, H. W. Strutt, Dr. Shugg, Dr. Sweetnam, Mr. L. W. Tankard, Dr. Whishaw, Mr. Frank Wells.

Lecture.

Mr. Clive Lord delivered an illustrated lecture on "The South West Coast and Port Davey."

11th April, 1927.

The Monthly Meeting was held in the Society's Rooms, on the 11th April, Dr. A. H. Clarke presiding.

The following were elected as members of the Society:— Miss E. Lawrence, Messrs. David Mellor, J. Morris, G. Murdoch, R. S. Sanderson, F. D. Valentine, G. H. Lord, Dr. J. H. B. Walch.

Papers.

The following papers were read:—

"The South-West Coast and Port Davey." By C. E. Lord.

"Existing Tasmanian Marsupials." By C. E. Lord.

A discussion took place concerning the need for the better protection of the native fauna. Mr. Lord spoke in favour of a special Board of Control.

A discussion took place concerning Mr. Lewis's paper on Tasmanian Physiography, those taking part being Messrs. P. B. Nye, W. H. Clemes, Major Giblin, Professor Pitman, and Mr. A. N. Lewis.

9th May, 1927.

Special Meeting.

A Special General Meeting was held at the Society's Rooms, The Tasmanian Museum, on Monday, 9th May, 1927, Dr. A. H. Clarke presiding.

In accordance with notice of motion duly given, Mr. A. N. Lewis moved the following additions to the Rules of the Society. In doing so, Mr. Lewis stated that the proposed rules had been approved by the Council, and by a committee appointed to report on same.

The Council recommends that the following be added to the rules of the Society:—

(1) That the Royal Society of Tasmania establish a medal to be known as the Royal Society of Tasmania Medal.

(2) This Medal is to be awarded by the Society in accordance with the undermentioned conditions, for eminence in research in any of the branches of knowledge within the purview for the time being of the Society.

(3) It is intended that this Medal shall be the Society's recognition of a long period of work of benefit to the community. The award is only to be made when the

Society considers a member to have become eligible. The Medal will not be awarded at any particular interval of time, and may be awarded as frequently as the Society thinks fit. A posthumous award may be made.

(4) No person shall be eligible to an award of the Medal unless

(a) 1. He (or she) has been an ordinary member of the Royal Society of Tasmania and a resident of Tasmania for the ten years immediately prior to the award of the Medal, or

2. He (or she) has been an ordinary member of the Royal Society of Tasmania and a resident of Tasmania for at least fifteen years during his or her lifetime and is a member of the Society and a resident of Tasmania at the time of the award, or

3. He (or she) has been a life member of the Royal Society of Tasmania for the five years prior to the award and a resident of Tasmania for ten years immediately prior to the award, or

4. He (or she) was born in Tasmania and his (or her) parents were at that time Tasmanian residents and he (or she) has attained world-wide pre-eminence in one of the branches of knowledge within the purview for the time being of the Society. And he (or she) is at the time of the award a member of the Society and has contributed a paper of world-wide interest read before the Society during the year previous to the award.

(b) Except in the case of an award under (a) 4 above, he (or she) is recognised by the Society as having carried out prolonged original research in some subject as aforesaid and has published, at least partly, in the Papers and Proceedings of the Society results of such research which are of value to the community. And except in the case of an award under (a) 4 above, at least ten papers shall have been read during a period of not less than ten years.

(5) The Council of the Society shall recommend an award to the Society and appoint an ordinary meeting at which the Society shall vote on the question of the award of the Medal. At least seven days' notice of the Council's recommendation shall be sent to each member, and at the meeting appointed by the Council the members present will vote on the question of the award. Any member present may require a ballot, and in such a case the Medal shall not be awarded unless three-fourths of the members present, and voting, vote in the affirmative. An affirmative vote at a duly notified meeting will constitute the award of the Medal. The Medal will then be presented as the Council thinks fit.

When an award of the Medal is made the recipient will be entitled to hold it for life unless the Society, in a manner similar to that prescribed for an award, deprive him (or her) of it.

9th MAY, 1927.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, Dr. A. H. Clarke presiding.

The following were elected members of the Society:—Messrs. F. Blake, P. J. Cherry, K. M. Dallas, F. C. E. Knight, K. Orme, M. G. Butcher.

Lecture.

Mr. F. E. Ward delivered an illustrated lecture on "Some Aspects of Grassland Improvement."

13th JUNE, 1927.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, Mr. L. Rodway, C.M.G., presiding.

Paper.

"Notes on a Series of 'Pounders' from Certain Localities of the West Coast of Tasmania." By R. W. Legge.

Lecture.

Mr. R. S. Russell delivered an illustrated lecture on "The Constitution of Metals in relation to their properties and applications."

11th JULY, 1927.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, Dr. A. H. Clarke presiding.

Lecture.

Mr. E. E. Unwin, M.Sc., delivered an illustrated lecture on "The Web of Life."

The Historical Section forwarded a proposal for the erection of a plaque to commemorate the landing of Lieutenant-Governor David Collins in February, 1804, when he selected Sullivan's Cove as a site for the future City of Hobart. A sketch design of the suggested plaque was tabled by Mr. G. W. R. Ife, who moved the adoption of the proposal, and stated that after some thought it had been decided that the nearest spot to the actual landing place on which it was now possible to place such a tablet, would be on one of the buildings belonging to Messrs. H. Jones and Co. The proposed memorial was a copper plaque, the wording being as follows:—"David Collins landed near this spot (Hunter's "Island) and founded the City of Hobart on the 20th Feb- "ruary, 1804."

Mr. A. N. Lewis reminded members of the protracted controversy over the exact situation of Tasman's landing place, and suggested the Historical Section should bring forward more definite data concerning the exact site of the landing. Mr. Clive Lord moved that the lettering of the tablet be altered to omit the words "Hunter's Island," the change being desirable for two reasons, firstly, that it would not be erected on Hunter's Island at all, and secondly, because it was quite possible that Collins did not land on Hunter's Island, but on the foreshore somewhere in the vicinity of where the Customs House now stands. The motion to omit the words "Hunter's Island" was carried.

Destruction of the Platypus.

A discussion took place in reference to the proposal made by certain of the Salmon and Freshwater Fisheries Commissioners concerning the removal of the restrictions on the killing of Platypus. The following resolution moved by Mr. Lord and seconded by Mr. Lewis was carried:—"That the "Royal Society of Tasmania notes with regret the Salmon "and Freshwater Fisheries Commissioners' proposal to ask "for the abolition of the total protection of the Platypus

"(*Ornithorhynchus anatinus*). The Society suggests that be-"fore further steps are taken the matter be investigated "by a competent authority, and suggests Dr. Colin MacKenzie "and Mr. Harry Burrell in this regard."

8th AUGUST, 1927.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, His Excellency Sir James O'Grady presiding.

Paper.

"A Revision of the Tasmanian Lepidoptera." By Dr. Jefferis Turner.

Lecturettes.

Members of the Historical Section delivered a series of lecturettes dealing with the period of Lieutenant-Governor Collins.

12th SEPTEMBER, 1927.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, Dr. A. H. Clarke presiding.

The following were elected members of the Society:—Messrs. J. W. Turner and R. J. Thirkell.

Lectures.

Messrs. E. T. Emmett and A. N. Lewis delivered lectures upon the South-West portion of Tasmania, Mr. Emmett dealing with the Hastings Caves and Mr. Lewis with Mount La Pérouse and adjacent country.

10th OCTOBER, 1927.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, Dr. A. H. Clarke presiding.

Paper.

The following paper was read:—

"Notes on the Diary of the Rev. Robert Knopwood." By C. E. Lord.

Address.

Professor J. B. Brigden delivered an address upon "The Economic Position of Tasmania."

Royal Society Medal.

The Royal Society's Medal was awarded to Mr. L. Rodway, C.M.G.

17th November, 1927.

The Monthly Meeting was held at the Society's Rooms, The Tasmanian Museum, Dr. A. H. Clarke presiding.

Papers.

The following papers were read:—

"Studies in Tasmanian Cetacea. Part VI." By H. H. Scott and Clive Lord.

"Studies in Tasmanian Spiders. Part II." By V. V. Hickman, B.A., B.Sc.

"The Growth of Self-Government in Tasmania." By A. L. Meston, M.A.

"A Further Account of the Geology of the Catamaran Coal Field." By A. N. Lewis, M.C., LL.M.

Dr. A. B. Walkom, General Secretary of the Australasian Association for the Advancement of Science, delivered an address on the work of the Association and the forthcoming meeting of the Association, to be held in Hobart in January, 1928.

Conversazione.

At the conclusion of the meeting a conversazione was held in the Art Gallery.

ANNUAL REPORT

1927.

THE ROYAL SOCIETY OF TASMANIA

Patron:

HIS MAJESTY THE KING.

President:

HIS EXCELLENCY SIR JAMES O'GRADY, K.C.M.G.

Vice-Presidents:

L. RODWAY, C.M.G.
A. H. CLARKE, M.R.C.S., L.R.C.P.

Council:
(Elected March, 1927.)

A. H. CLARKE, M.R.C.S., L.R.C.P. (Chairman).
W. H. CLEMES, B.A., B.Sc.
W. E. L. CROWTHER, D.S.O., M.B.
W. H. CUMMINS, A.I.A.C
L. F. GIBLIN, D.S.O.
J. A. JOHNSON, M.A.
A. N. LEWIS, M.C., LL.M.
CLIVE LORD, F.L.S.
L. RODWAY, C.M.G.
E. E. UNWIN, M.Sc.

Standing Committee:

L. F. GIBLIN, E. E. UNWIN, C. LORD.

Hon. Treasurer:

W. E. L. CROWTHER, D.S.O., M.B.

Editor:

CLIVE LORD, F.L.S.

Auditor:

WALTER E. TAYLOR, F.F.I.A., F.I.A.S.

Secretary and Librarian:

CLIVE LORD, F.L.S.

LIST OF MEMBERS

Honorary Members:

David, Sir T. W. Edgeworth, K.B.E., C.M.G., B.A., F.R.S., F.G.S., Emeritus Professor of Geology and Physical Geography in the University of Sydney. "Coringah," Sherbroke Road, Hornsby, N.S.W.

Mawson, Sir Douglas, D.Sc, B.E., F.R.S. Professor of Geology and Mineralogy, the University, Adelaide.

Spencer, Sir William Baldwin, K.C.M.G., M.A., D.Sc., Litt.D., F.R.S. Melbourne.

Wood-Jones, Professor F., M.B., B.S., M.R.C.S., L.R.C.P., D.Sc., F.R.S. The University, Honolulu, Hawaii.

Corresponding Members:

Year of Election.

1901 Benham, W. B., M.A., D.Sc., F.R.S., F.Z.S. Professor of Biology, University of Otago, Dunedin, N.Z.

1892 Bragg, Sir W. H., M.A., F.R.S. Director of the Royal Institution, Albemarle Street, London.

1901 Chapman, Professor R. W., M.A., B.C.E. The University, Adelaide.

1923 Pulleine, R., M.B. 163 North Terrace, Adelaide.

1902 Smith, R. G., D.Sc. Linnean Hall, Linnean Society of N.S.W., 16 College Street, Sydney.

1892 Thomson, Hon. G. M., M.L.C., F.L.S. 99 Eglinton Road, Dunedin, N.Z.

1901 Wall, A., Professor, M.A. Canterbury College, Christchurch, N.Z.

Life Members:

1918 Avery, J. 52 Southerland Road, Annadale, Melbourne.

1908 Baker, H. D. American Consular Service, Washington.

1890 Foster, Lieutenant-Colonel Henry. "Merton Vale," Campbell Town.

1905 Grant, C. W. "High Peak," Huon Road.

1894 Mitchell, J. G. Parliament Street, Sandy Bay.

1896 Sprott, G., M.D. Town Hall, Hobart.

Members:

Year of Election.

1921 Anderson, G. M., M.D., C.M. Clare Street, New Town.

1923 Agnew, Miss K. Augusta Road, New Town.

1921 Allen, D. V., B.Sc. Launceston Technical School, Launceston.

1924 Allen, F. A. 13 Franklin Street, West Hobart.

1925 Ashbolt, Sir Alfred. "Lenna," Battery Point.

1926 Atkins, C. N., M.B., B.S., D.P.H. 145 Macquarie Street, Hobart.

1927 Atkinson, T. H. Department of Agriculture, 90 Cameron Street, Launceston.

1921 Baker, H. S., LL.B. Messrs. Griffiths, Crisp, and Baker, Collins Street, Hobart.

1887 Barclay, D. 143 Hampden Road, Hobart.

1927 Barnes, G. L. C/o Messrs. Giblin and Piesse, Hobart.

1921 Barr, J. Stoddart, M.D. (Glasgow). Lower Sandy Bay.

1926 Barrett, Rev. W. R. Cressy, Tasmania.

1890 Beattie, J. W. 28 Jordan Hill Road.

1918 Bellamy, H., J.P., M.Am.Soc. C.E., M.I.Mech.E., F.R. San. I. Government Hydraulic Engineer. Adelaide.

1924 Bennett, H. W., L.D.S., D.D.S. Brisbane Street, Launceston.

1903 Bennett, W. H. Ashby, Ross.

1922 Biss, F. L. U.S.S. Co., Hobart.

1909 Blackman, A. E. 26 Warwick Street.

1920 Blaikie, T. W. Practising School, Elizabeth Street, Hobart.

1927 Blake, Frank. Red Chapel Road, Lower Sandy Bay.

1918 Bowling, J. "Barrington," Tower Road, New Town.

1924 Booth, N. P. Messrs. Cadbury-Fry-Pascall Ltd., Claremont.

1925 Bowden, F. P. Jordan Hill Road.

1925 Bowerman, Captain. Marine Board, Hobart.

1923 Breaden, J. C. 12 Waverley Avenue, New Town.

1923 Brett, R. G. 53a Hill Street, Hobart.

1917 Brettingham-Moore, E., M.B., Ch.M. Macquarie Street, Hobart.

1925 Brigden, Professor J. B., B.A. Professor of Economics, Tasmanian University, Hobart.

1911 Brooks, G. V. Director of Education, Hobart.

1922 Brownell, C. C. 117 Hampden Road, Battery Point.

Year of Election.

1907 Brownell, F. L. "Berwyn," Mercer Street, New Town.
1924 Budge, E. A., B.Sc. 302 Argyle Street, Hobart.
1918 Burbury, Frederick. "Holly Park," Parattah.
1919 Burbury, Charles. "Brookside," Moonah.
1927 Butcher, M. G. 103 York Street, Sandy Bay.
1925 Butler, A. L. Lower Sandy Bay.
1923 Butler, Mrs. G. H. 30 Augusta Road, New Town.
1909 Butler, W. F. D., B.A., M.Sc., LL.B. Bishop Street, New Town.
1924 Calver, C. W. 112 Brisbane Street, Launceston.
1920 Cane, F. B. 90 High Street, Sandy Bay.
1927 Cherry, P. J. Burnie.
1913 Chepmell, C. H. D. Clerk of the Legislative Council, Hobart.
1920 Clark, W. I., M.B. Macquarie Street, Hobart.
1896 Clarke, A. H., M.R.C.S., L.R.C.P. Domain Cottage, The Domain, Hobart.
1918 Clarke, T. W. H. "Quorn Hall," Campbell Town.
1910 Clemes, W. H., B.A., B.Sc. Clemes College, Hobart.
1922 Collier, J. D. A. The Librarian, Tasmanian Public Library, Hobart.
1925 Coogan, W. Lord Street, Sandy Bay, Hobart.
1927 Cooper, S. G. 5 Main Road, New Town.
1911 Crowther, W. L., D.S.O., M.B. Macquarie Street, Hobart.
1917 Cullen, Rev. John. Macquarie Street, Hobart.
1918 Cummins, W. H., A.I.A.C. Manager, *The Mercury* Office, Hobart.
1922 Davidson, R. Temple Chambers, Macquarie Street, Hobart.
1927 Dallas, K. M. State High School, Launceston.
1924 Davies, G. B. 111 Patrick Street, Hobart.
1919 Davies, H. Warlow. 22 Augusta Road, New Town.
1923 Davis, Alfred. Lord Street, Sandy Bay.
1923 Davis, Charles. Red Chapel Road, Lower Sandy Bay.
1908 Dechaineux, L. Principal of the Technical College, Hobart.
1921 Dryden, M. S. 13 Hillside Crescent, Launceston.
1921 Eberhard, E. C. Charles Street, Launceton.
1919 Elliott, E. A., M.B., Ch.M. Main Road, New Town.
1921 Emmett, E. T. Railway Department, Hobart.
1921 Erwin, H. D. Hutchins School, Hobart.
1918 Evans, L. The Agricultural Department, Hobart.
1921 Eyre, H. Manual Training School, Launceston.

Year of Election.

1902 Finlay, W. A. 11 Secheron Road, Hobart.
1918 Fletcher, C. E., M.A. Education Department, Hobart.
1921 Forward, J. R. Mechanics' Institute, Launceston.
1921 Fox, Miss. Ladies' College, Launceston.
1918 Gatenby, R. L. Campbell Town.
1927 Gates, W. 41 Hunter Street, Hobart.
1927 Gellibrand, W. T. "Lachlan Vale," Ouse, Tasmania.
1922 Giblin, A. V. King Street, Sandy Bay.
1925 Giblin, Miss Ella. 326 Macquarie Street, Hobart.
1927 Giblin, Dr. Arthur. Macquarie Street, Hobart.
1908 Giblin, Major L. F., D.S.O., B.A. Davey Street, Hobart.
1926 Giblin, R. W. 77 Harrington Gardens, London, S.W. 7.
1924 Giblin, W. W., M.R.C.S., L.R.C.P. Macquarie Street, Hobart.
1927 Gillies, C. L. Department of Agriculture, Hobart.
1923 Gorringe, J. A. Kempton, Tasmania.
1923 Gould, H. T. Liverpool Street, Hobart.
1927 Grant, H. N. Tasmanian Club, Hobart.
1924 Gray, H. 93 Macquarie Street, Hobart.
1923 Green, Dr. A. W. 30 Parliament Street, Sandy Bay.
1927 Gruin, H. A. Box 432B G.P.O., Hobart.
1921 Hall, E. L. 38 Lyttleton Street, Launceston.
1922 Halligan, G. H., F.G.S. "Alameda," Challis Avenue, Turramurra, N.S.W.
1918 Harrap, Lieutenant-Colonel G. Launceston.
1919 Hay, Rt. Rev. R. S., D.D. Bishop of Tasmania, Bishopscourt, Hobart.
1924 Henry, Dr. C. C., M.B., F.R.C.S. St. John Street, Launceston.
1924 Heritage, F. W. Collins Street, Hobart
1921 Heritage, J. E. Frederick Street, Launceston.
1921 Heyward, F. J., F.R.V.I.A. 43 Lyttleton Street, Launceston.
1915 Hickman, V. V., B.A., B.Sc. Mulgrave Crescent, Launceston.
1914 Hitchcock, W. E. Moina, Tasmania.
1918 Hogg, G. H., M.D., C.M. 37 Brisbane Street, Launceston.
1921 Hogg, W. Public Buildings, Launceston.
1922 Hood, Captain F. W. Customs House, Hobart.
1923 Hudspeth, W. H. "The Nook," Lower Sandy Bay.
1923 Hungerford, Mrs. "Hathaway House," Holebrook Place.

Year of Election.

1923 Hungerford, Miss. "Hathaway House," Holebrook Place.

1909 Hutchison, H. R. 1 Barrack Street, Hobart.

1922 Huxley, G. H., M.A. Kent Avenue, West Hobart.

1913 Ife, G. W. R., LL.B. Mortimer Avenue, New Town.

1925 Irby, L. G. Conservator of Forests, Forestry Department, Hobart.

1898 Ireland, E. W. J., M.B., C.M. Launceston General Hospital, Launceston.

1919 Jackson, George A. 79 Collins Street, Hobart.

1906 Johnson, J. A., M.A. Training College, Hobart.

1922 Johnson, W. R. Clemes College, Hobart.

1922 Johnston, J. R. Murray Street, Hobart.

1921 Judd, W., M.A. College Street, Launceston.

1911 Keene, E. H. D., M.A. Burnie.

1922 Kemp, Andrew. Stoke Street, New Town.

1922 Kennedy, J. 96 Montpelier Road, Hobart.

1924 Kennedy, Mrs. J. 96 Montpelier Road, Hobart.

1927 King, C. S. 12 Swanston Street, New Town.

1927 Kirby, E. R. 13 Mortyn Avenue, Hobart.

1918 Knight, C. E. L., B.Sc. Claremont.

1927 Knight, F. C. E. Claremont.

1919 Knight, H. W. National Mutual Buildings, Hobart.

1913 Knight, J. C. E. Claremont.

1927 Koch, R. W. 82 Collins Street, Hobart.

1927 Lawrence, Miss E. 182 Melville Street, Hobart.

1924 Legge, R. W. Cullenswood, Tasmania.

1919 Lewis, A. N., M.C., LL.M. "Werndee," Augusta road, New Town.

1887 Lewis, Sir N. E., K.C.M.G., M.A., B.C.L., LL.B. Augusta Road, New Town.

1912 Lindon, L. H. "The Lodge," Park Street, Hobart.

1926 Lindon, Mrs. "The Lodge," Park Street, Hobart.

1900 Lines, D. H. E., M.B., Ch.B. Archer Street, New Town.

1921 Listner, W. P., M.A., LL.B. Augusta Road, New Town.

1912 Lord, Clive E., F.L.S., Director of the Tasmanian Museum. "Cliveden," Sandy Bay.

1927 Lord, Graham H. Vacuum Oil Co., Hobart.

1921 Lord, Raymond. "Handroyd," 6 Franklin Street, Hobart.

1924 Lord, Ronald. Derwentwater Avenue, Sandy Bay.

1922 Low, H. M. "The Gables," Pottery Road, New Town.

Year of Election.

1927 McAlister, Miss M. C. Government Analyst's Department, Hobart.
1893 McAulay, Professor A., M.A. The University, Hobart.
1923 McAulay, A. L., Ph.D. The University, Hobart.
1921 McClinton, Dr. R. 70 St. John Street, Launceston.
1927 Mace, Miss V. E. "The Pottery," Bothwell.
1927 Macfarlane, Charles. State High School, Hobart.
1922 Macleod, Mrs. L. H. High Street, Sandy Bay.
1919 Mackay, A. D. 26 High Street, Launceston.
1926 Mackenzie, D. C. "St. Ives," Hampden Road, Hobart.
1918 Mansell, A. E. Arthur Street, West Hobart.
1924 Marsh, James. "Ingomar," Patrick Street, Hobart.
1918 Martin, Brigadier-General W. Launceston.
1921 Masters, A. H. A.M.P. Chambers, Launceston.
1927 Mathers, Andrew. 293 Liverpool Street, Hobart.
1926 Meredith, David. Electrolytic Zinc Co., Risdon.
1927 Meredith, Mrs. D. 67 High Street, Sandy Bay.
1921 Meston, A. L. 47 High Street, Launceston.
1927 Mellor, David. The University, Hobart.
1909 Millen, Senator J. Roxburgh, Newstead.
1907 Miller, L. S., M.B., Ch.B. 156 Macquarie Street, Hobart.
1921 Miller, R. M. State High School, Launceston.
1911 Montgomery, R. B. "Astor," Macquarie Street, Hobart.
1927 Morris, J. M. The Union Bank, Hobart.
1927 Murdoch, George. Macquarie Street, Hobart.
1918 Murdoch, Honourable Thomas, M.L.C. 55 Montpelier Road, Hobart.
1926 Murray, L. C. 124 Warwick Street, Hobart.
1921 Muschamp, Rev. E. Holy Trinity Rectory, Launceston.
1925 Nettlefold, R. Macquarie Street, Hobart.
1924 Newall, A. P. Charles Street, Moonah.
1882 Nicholas, G. C. "Cawood," Ouse.
1918 Nicholls, Sir Herbert, K.C.M.G., Chief Justice of Tasmania. Pillinger Street, Sandy Bay.
1910 Nicholls, H. M. Department of Agriculture, Hobart.
1921 Nye, P. B., M.Sc., B.M.E. Geological Survey Office, Hobart.
1917 Oldham, N. New Town.
1921 Oldham, W. C. 39 George Street, Launceston.
1924 Oliver, H. Lindisfarne.
1927 Orme, K. "Sydney Lodge," Brisbane Street, Hobart.
1922 Overell, Miss Lilian. Holebrook Place, Hobart.
1921 Padman, R. S. 56 St. John Street, Launceston.
1921 Patten, W. H. 59 Cameron Street, Launceston.
1923 Parker, Dr. G. M. Bellerive.

Year of Election.

1922 Parker, H. T., M.A. "Montana," Bellerive.

1923 Pedder, A. Stoke Street, New Town.

1927 Penman, C. J. 23 York Street, Launceston.

1922 Perrin, Miss K. C/o Mrs. Harner, 12 York Street, Launceston.

1902 Piesse, E. L. "Merridale," Sackville Street, Kew, Melbourne.

1910 Pillinger, J. 4 Fitzroy Crescent, Hobart.

1926 Pitman, Professor E. J. The University, Hobart.

1918 Pitt, F. C. K. "Glen Dhu," The Ouse.

1925 Pratt, A. W. Courtney. "Athon," Mount Stuart Road, Hobart.

1927 Pratt, Rev. F. Davey Street, Hobart.

1925 Propsting, G. L. Earl Street, Sandy Bay.

1923 Purcell, G. A. Clemes College, Hobart.

1927 Raymond-Barker, A. B. Darcy Street, Hobart.

1921 Reid, A. McIntosh. Director of Mines, Hobart.

1922 Reid, A. R. Curator, Beaumaris Zoo, Domain, Hobart.

1925 Reid, Miss M. L. The University, Hobart.

1921 Reid, W. D. Public Buildings, Launceston.

1921 Reynolds, John. Knocklofty Terrace, Hobart.

1926 Rivers, Miss. The Deanery, Hobart.

1926 Rivers, Mrs. Godfrey. Holebrook Place, Hobart.

1925 Robinson, F. G. 42 Regent Street, Sandy Bay.

1926 Robson, Mrs. "Elsinore," The Avenue, Elphin Road, Launceston.

1884 Rodway, L., C.M.G. 77 Federal Street, Hobart.

1923 Rogers, G. H. B. 204 Davey Street, Hobart.

1921 Rolph, W. R. *Examiner* and *Courier* Office, Launceston.

1913 Ross, Hector. Cambridgè, Tasmania.

1927 Russell, R. S. Box 444B G.P.O., Hobart.

1927 Sanderson, R. S., J.P. Burnie.

1922 Sargison, H. Elizabeth-street, Hobart.

1921 Savigny, J. A.M.P. Chambers, Launceston.

1921 Scott, H. H. Curator, Victoria Museum, Launceston.

1896 Scott, R. G., M.B., Ch.M. 172 Macquarie Street, Hobart.

1927 Shield, R. J. 122 Collins Street, Hobart.

1921 Shields, Honourable Tasman, M.L.C. 13 Patterson Street, Launceston.

1926 Shiels, Dr. 118 Main Road, Moonah.

1925 Shoobridge, K. Macquarie Plains, Tasmania.

1921 Shoobridge, Honourable L. M., M.L.C. "Sunnyside," New Town.

Year of Election.

1925 Shoobridge, Rupert. "Fenton Forest," Glenora.
1923 Shoobridge, S. E. C/o Messrs. H. Jones and Co, Hobart.
1927 Shugg, Dr. Macquarie Street, Hobart.
1923 Simson, Mrs. L. 3 St. George's Square, Launceston.
1917 Slaytor, C. H. Misterton, Doncaster, England.
1927 Smith, Miss Marjorie. "Glithno," Errita, Wilmot.
1925 Smith, Colonel R. P. A.M.P. Society, Hobart.
1921 Smithies, F. 34 Patterson Street, Launceston.
1925 Stackhouse, C. K. R. 55 Patterson Street, Launceston.
1924 Stephens, Crofton. Messrs. Clerk, Walker, Stops, and Stephens, Collins Street, Hobart.
1919 Stevenson, Miss F. "Leith House," New Town.
1927 Strutt, H. W. C/o Messrs. Macfarlane Bros., Hobart.
1927 Sweetnam, Dr. Macquarie Street, Hobart.
1920 Swindells, A. W. 2 Patrick Street, Hobart.
1927 Tankard, L. W. Sheffield.
1918 Taylor, W. E. Elboden Street, Hobart.
1920 Taylour, W. H. Equitable Buildings, Collins Street, Melbourne.
1927 Thirkell, R. A. C. 405 Elizabeth Street, Hobart.
1923 Thomas, J. F. Room 8, Wilga Chambers, 158 Phillip Street, Sydney.
1922 Thomas, Lieutenant-Colonel L. R., D.S.O. Registrar of the Tasmanian University, Hobart.
1921 Thomas, P. H. Agricultural Department, Hobart.
1922 Thompson, E. H. Lower Sandy Bay.
1918 Thorold, C. C. Hutchins School, Hobart.
1926 Turner, A. Jefferis, M.D., F.E.S. Wickham Terrace, Brisbane, Queensland.
1927 Turner, J. W. Mona Street, Battery Point.
1923 Unwin, E. E., M.Sc. "Pendle Hill," Mortimer Avenue, New Town.
1925 Urquhart, M. L. Ashfield Street, Sandy Bay.
1927 Valentine, F. D. 41 Main Road, New Town.
1927 Walch, J. H. B., M.B. 71 Crescent Road, West Hobart.
1918 Walch, P. B. C. King Street, Sandy Bay.
1925 Walker, Norman. The Hutchins School, Hobart.
1926 Ward, F. E. Director of Agriculture, Hobart.
1913 Wardman, John. Superintendent Botanical Gardens, Hobart.
1918 Waterhouse, G. W. Messrs. Ritchie and Parker, Alfred Green and Co., Launceston.
1922 Waterworth, E. N. Poet's Road, West Hobart.
1922 Watson, D. W. "Undine," Glenorchy.

Year of Election.

1926 Waugh, Eric C., LL.B. High Street, Sandy Bay.
1922 Wayn, Miss A. L. C/o Mrs. J. Moore-Robinson, Lambert Avenue, Lower Sandy Bay.
1918 Weber, A. F. Lands Department.
1927 Wells, Frank. 16 Montagu Avenue, New Town.
1923 Wherrett, Miss A. Florence Street, Moonah.
1926 Whittle, B. N. Augusta Road, New Town.
1925 Winch, M. C/o Brownells Ltd., Hobart.
1901 Wise, H. J. Lambert Avenue, Sandy Bay.
1927 Whishaw, Dr. R. Macquarie Street, Hobart.

ANNUAL REPORT

1927.

The Council and Officers.

The Annual Meeting was held at the Society's Rooms, The Tasmanian Museum, Hobart, on the 28th February, 1927.

The following were elected members of the Council for 1927:—Dr. A. H. Clarke, Dr. W. E. L. Crowther, Messrs. W. H. Clemes, W. H. Cummins, L. F. Giblin, J. A. Johnson, A. N. Lewis, E. E. Unwin, and C. E. Lord (*ex officio*).

During the year eleven meetings of the Council were held, the attendance being as follows:—Mr. Lord 11, Dr. Clarke (elected March) 9, Mr. Giblin 9, Dr. Crowther 8, Mr. Unwin 8, Mr. Lewis 8, Mr. Rodway 7, Mr. Clemes 6, Mr. Johnson 7, Mr. Cummins 3.

The Council at its first meeting made the following appointments:—

Chairman of Council.—Dr. A. H. Clarke, M.R.C.S., L.R.C.P.

Secretary.—Mr. Clive Lord.

Standing Committee.—Messrs. Unwin, Lord, and Major Giblin.

Editor of Papers and Proceedings.—Mr. Clive Lord.

Hon. Treasurer.—Dr. W. E. L. Crowther.

Trustees of the Tasmanian Museum and Botanical Gardens.—Dr. Clarke, Dr. Crowther, Messrs. Rodway, Clemes, Lewis, and Unwin.

Meetings.

During the year one special and eight ordinary meetings of the Society were held. Details of the meetings will be found in the Abstract of Proceedings. The attendance at the meetings during the year has been well maintained, and at certain of the lectures the seating accommodation was fully taxed.

Membership.

The membership of the Society may well be considered satisfactory, as the roll at the end of the year shows the following:—

4 Honorary Members.
7 Corresponding Members.
6 Life Members.
262 Ordinary Members.

R. M. JOHNSTON MEMORIAL.

THE R. M. JOHNSTON MEMORIAL MEDAL.

List of Awards:

1923 Sir T. W. Edgeworth David, K.B.E., C.M.G., B.A., F.R.S., F.G.S.
1925 Professor F. Wood-Jones, M.B., B.S., M.R.C.S., L.R.C.P., D.Sc.

Historical.

At the instance of the Historical Section consideration was given to the question of the erection of a suitable memorial to commemorate the landing of Lieutenant-Governor David Collins and the foundation of the City of Hobart on the 20th February, 1804. The Historical Section has the matter in hand, and it is anticipated that the erection of the memorial will be proceeded with in the near future.

The question of the filmed version of "The Term of His Natural Life" was again considered by the Society this year and a resolution was passed reaffirming the previously expressed opinion of the Society and protesting against the historical inaccuracies of the film and its export from Australia.

Library.

The attention of the Government was again directed to the position of the Society's Library, but so far the Council has not been advised if it may expect the proposed improvements to be carried out. The Society's Library forms a unique scientific reference library for the whole of the State, and its present overcrowded condition, in addition to causing much unnecessary work for those responsible for the care of the Library, also means, in many cases, lack of references which would otherwise be available. With the rapid expansion of the Library the position has become a very serious one.

Sections.

Several Sections continued their special work during the period under review. Details concerning their activities will be found in the Sectional Reports.

Obituary.

It is with regret that the Society has to record the deaths of the following:—

Corresponding Member: Professor A. Liversidge, "Fieldhead," Coombe Warren, Kingston, Surrey, England.

Life Member: D. H. Harvey, "Manresa," Lower Sandy Bay.

Members: G. Horne, V.D., M.S., Ch. B., Lister House, Collins Street, Melbourne; F. M. Young, Montagu Street, New Town.

BRANCH REPORT

NORTHERN BRANCH.

ANNUAL REPORT FOR 1927.

Our Annual Meeting was held on 22nd June, Mr. R. O. Miller, B.A., presiding, when the following officers were re-elected to the Committee:—Hon. Tasman Shields, Messrs. R. O. Miller, J. E. Heritage, F. Smithies, J. R. Forward, F. J. Heyward, W. D. Reid, and R. S. Padman (Hon. Secretary and Treasurer). Mr. W. R. Rolph was elected to the position on the Council rendered vacant by the resignation of Mr. H. H. Scott.

Regret was expressed at the resignation of Mr. Scott as a member of the Council, owing to the pressure of other duties which prevented his accepting office for this year.

The Secretary was instructed to convey to the Mechanics' Institute the thanks of the Branch for the use of rooms for Council and General Meetings.

At the conclusion of the formal business a historical paper on "The Growth of a Constitution in Tasmania" was read by Mr. A. L. Meston, M.A.

26th July.—Mr. Clive Lord, F.L.S., gave an interesting lantern lecture, "South-Western Tasmania and Port Davey."

28th August.—Paper by Mr. R. O. Miller, B.A., on "Some Aspects of the New Education."

28th September.—An informal historical evening and discussion on "Recollections of Early Launceston" was held. General Martin introduced the subject. Many interesting personal reminiscences concerning people, buildings, and social conditions of the early sixties were referred to by the various speakers. This meeting aroused a good deal of local interest, and was followed on 2nd November by a paper "Some Sidelights on the History of Early Launceston," representing the result of historical research by Mr. E. J. Sidebottom.

The members of this Branch view with considerable interest the recent purchase by the Launceston City Council of the Beattie Collection relating to the early history of Tasmania. It is intended to place the papers and documents forming part of this collection, together with a large collection already belonging to the Museum, in a special library so that they may be available to students interested in historical research.

SECTION REPORTS

EDUCATIONAL AND PSYCHOLOGICAL SECTION.

Mr. H. T. Parker, M.A., was elected President.

This year's meetings have been given to a discussion of Education in general, both historically and as regards its development in different countries.

The list of subjects and speakers is as follows:—

8th March.—"Education in Ancient Greece." By Mr. J. A. Johnson.

26th April.—"The History of Education during the "Middle Ages." By Mr. Norman Walker.

7th June.—"Education During the Renaissance." By Mr. G. Huxley.

28th June.—"The Present State of Education in France." By Mr. Dechaineux.

18th July.—"Education in the United States of America." By Mr. H. T. Parker.

16th August.—"Education in Germany." By Major L. F. Giblin.

20th September.—"Education in Soviet Russia." By Mr. T. W. Blaikie.

18th October.—"Education in Japan." By Mr. E. E. Unwin.

The nature of the syllabus has rendered it unsuitable for repetition in any form at a meeting of the Royal Society. None the less Section members are so satisfied with the success of the course of papers that they have decided to carry the series into next year. Owing to the number of active members many of the subjects for 1928 have been allotted to joint speakers.

NORMAN WALKER,

Honorary Secretary.

HISTORICAL SECTION.

The year 1927 has been a satisfactory one for the work of the Section. Four meetings (three ordinary and one luncheon) were held, when a number of matters of historical interest were dealt with.

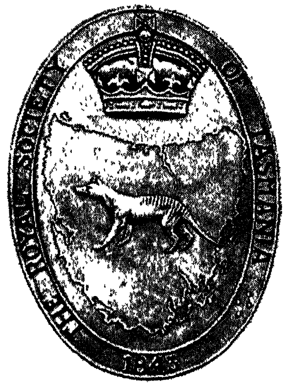
At the August meeting of the Society, members of the Section read papers on the period of Lieutenont-Governor Collins. Mr. W. F. D. Butler (the Chairman) dealt with the life of Collins and made special reference to his pioneering judicial work in New South Wales. Mr. G. W. R. Ife described his administrative work in Tasmania, and Mr. A. Pedder gave a detailed account of the selection of the site for settlement at Sullivan's Cove. Mr. E. C. Waugh gave a survey of the times of Collins (1756-1810), which provided general background for the studies. Mr. Clive Lord contributed some new facts about early Hobart which he had discovered during the course of his investigation of the Knopwood diary.

The destruction of tombstones in St. George's burial ground caused apprehension among members of the Section. It was particularly hoped that the monument to William Race Allison (a prominent politician of the 'fifties) would be spared. The Section brought the matter under the notice of the Director of Education (Mr. G. V. Brooks). As a result of his good services the monument, which was erected by public subscription, will be fittingly preserved.

As far back as 1923 a suggestion was made that the landing place of Lieutenant-Governor Collins and his party should be marked. The late Sir Henry Jones expressed his sympathy with the scheme. This year a sub-committee of the Section brought the matter under the notice of Lady Jones, who expressed her interest and donated £10 10s. towards the erection of a suitable memorial. Mr. F. Peacock, on behalf of his firm (H. Jones Co-operative), promised his assistance, and a similar donation. It was decided that a metal tablet with a medallion inset was the most suitable form the monument could take, and a design has been prepared. The estimated cost is £60, and the Section appeals to members of the Society to support the scheme, which will show some recognition of the work of the first settlers.

J. REYNOLDS,

Hon. Secretary.



THE ROYAL SOCIETY OF TASMANIA MEDAL.

List of Awards:

1927 L. Rodway, C.M.G.

Note.—The Royal Society of Tasmania Medal was established in 1927. It is awarded for eminence in research and for work of outstanding merit on behalf of the Society and the State.

ROYAL SOCIETY OF TASMANIA.

RECEIPTS AND EXPENDITURE, 1927. GENERAL FUND.

RECEIPTS.

	£	s.	d.	£	s.	d.
Balance brought forward				2	18	9
Subscriptions—						
Arrears	10	10	0			
Current	214	4	0			
Advance	3	3	0			
				227	17	0
Donation				2	2	0
Sale of Publications				16	0	0
Government Grant				100	0	0
Rent of Room				14	4	6
				£363	2	3

EXPENDITURE.

	£	s.	d.	£	s.	d.
Salaries				40	5	0
Papers and Proceedings—						
1926 (Part)	139	7	0			
„ 1927 (Part)	91	16	3			
				231	3	3
Printing, Notices of Meetings, &c.				23	3	6
Library				22	18	0
Insurance				5	18	9
Light and Fuel				3	9	5
Petty Cash and Postages				13	17	3
Northern Branch Refund				10	17	0
Miscellaneous				9	4	6
Cheque Returned				2	2	0
Cr. Balance				0	3	7
				£363	2	3

W. L. CROWTHER, M.B.,
Hon. Treasurer.

CLIVE E. LORD,
Secretary.

Examined and certified to be correct,
WALTER E. TAYLOR, F.F.I.A., Hon. Auditor.

25/1/28.

ROYAL SOCIETY OF TASMANIA.

MORTON ALLPORT MEMORIAL FUND, 1927.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
Revenue, 1927	9	15	0	Refund to R.M.J. Fund	4	7	0
Advance from R.M.J. Fund	10	4	0	Witherby and Co., Final Payment Mathews's "Birds of Australia"	15	12	0
	£19	19	0		£19	19	0

Examined and certified to be correct,

WALTER E. TAYLOR, F.F.I.A., Hon. Auditor.

25/1/28.

R. M. JOHNSTON MEMORIAL FUND, 1927.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
Balance brought forward	18	3	10	Purchase of Books for Library	22	10	10
Refund from M.A.M. Fund	4	7	0	Loan to M.A.M. Fund	10	4	0
Interest	14	12	0	Credit Balance	4	8	0
	£37	2	10		£37	2	10

Examined and certified to be correct,

WALTER E. TAYLOR, F.F.I.A., Hon. Auditor.

25/1/28.

W. L. CROWTHER, M.B.,
Hon. Treasurer.

CLIVE E. LORD,
Secretary.

ROYAL SOCIETY OF TASMANIA.

NORTHERN BRANCH.

ANNUAL FINANCIAL STATEMENT FOR YEAR ENDING DECEMBER, 1927.

	£	s.	d.		£	s.	d.
Balance brought forward	24	2	1	Advertising	4	16	0
Interest	0	17	11	Printing	2	8	0
Share of Subscriptions	10	17	0	Travelling Expenses	2	0	0
				Postages and Petty Cash	0	17	6
				Balance in Bank	25	15	6
	£35	17	0		£35	17	0

R. STEWART PADMAN,
Hon. Sec. and Treasurer.

J. E. HERITAGE,
Hon. Auditor.

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Titles of Papers and New Genera and Species in Heavy Type.
Synonyms in *italics*.

THE ROYAL SOCIETY

OF

TASMANIA

PAPERS & PROCEEDINGS

OF

THE ROYAL SOCIETY OF TASMANIA

FOR THE YEAR

1928

(With 32 Plates and 9 Text Figures)

ISSUED 11th MARCH, 1929

PUBLISHED BY THE SOCIETY

The Tasmanian Museum, Argyle Street, Hobart
1929

Price: Ten Shillings

The responsibility of the statements and opinions in the following papers and discussions rests with the individual authors and speakers; the Society merely places them on record.

THE ROYAL SOCIETY OF TASMANIA

The Royal Society of Tasmania was founded on the 14th October, 1843, by His Excellency Sir John Eardley Eardley Wilmot, Lieutenant Governor of Van Diemen's Land, as "The Botanical and Horticultural Society of Van Diemen's Land." The Botanical Gardens in the Queen's Domain, near Hobart, were shortly afterwards placed under its management, and a grant of 400 a year towards their maintenance was made by the Government. In 1844, His Excellency announced to the Society that Her Majesty the Queen had signified her consent to become its patron; and that its designation should thenceforward be "The Royal Society of Van Diemen's Land for Horticulture, Botany, and the Advancement of Science."

In 1848 the Society established the Tasmanian Museum; and in 1849 it commenced the publication of its "Papers and Proceedings."

In 1854 the Legislative Council of Tasmania by "The Royal Society Act" made provision for vesting the property of the Society in trustees, and for other matters connected with the management of its affairs.

In 1855 the name of the Colony was changed to Tasmania, and the Society then became "The Royal Society of Tasmania for Horticulture, Botany, and the Advancement of Science."

In 1860 a piece of ground at the corner of Argyle and Macquarie streets, Hobart, was given by the Crown to the Society as a site for a Museum, and a grant of £3,000 was made for the erection of a building. The Society contributed £1,800 towards the cost, and the new Museum was finished in 1862.

In 1885 the Society gave back to the Crown the Botanical Gardens and the Museum, which, with the collections of the Museum, were vested in a body of trustees, of whom six are chosen from the Society. In consideration of the services it had rendered in the promotion of science, and in the formation and management of the Museum and Gardens, the right was reserved to the Society to have exclusive possession of sufficient and convenient rooms in the Museum, for the safe custody of its Library, and for its meetings, and for all other purposes connected with it.

In 1911 the Parliament of Tasmania, by "The Royal Society Act, 1911," created the Society a body corporate by the name of "The Royal Society of Tasmania," with perpetual succession.

The object of the Society is declared by its Rules to be "the advancement of knowledge."

His Majesty the King is Patron of the Society; and His Excellency the Governor of Tasmania is President.

THE ROYAL SOCIETY OF TASMANIA

PAPERS AND PROCEEDINGS, 1928.

CONTENTS.

PAPERS

OF

THE ROYAL SOCIETY OF TASMANIA

1928.

ON SOME REMARKABLE ANNELID REMAINS FROM ARTHUR RIVER, N.W. TASMANIA.

By

FREDERICK CHAPMAN, A.L.S., F.G.S., F.R.M.S.
(Commonwealth Palæontologist).

Plate I.

(Read 12th March, 1928.)

GENERAL REMARKS.

Some little while ago the Government Geologist of Tasmania, Mr. P. B. Nye, M.Sc., B.M.E., forwarded to me at the National Museum, Melbourne, for determination, a specimen of slaty shale with fossil impressions.

The remains and impressions in this Tasmanian rock are much sharper and clearer than anything of the same nature I had seen described from such old rocks, excepting those remarkable examples by Dr. C. D. Walcott from the Middle Cambrian of Burgess County, British Columbia. And here it may be apposite to note that from similarly ancient Tasmanian rocks Sir T. W. Edgeworth David not so long since discovered the interesting phyllocarid genus, *Hurdia*, which was also previously found by Walcott in British Columbia.

Although at the present time I feel competent to give only a preliminary note on this interesting find, it is so important that it will be a fitting opportunity to present it now.

NATURE OF THE ROCK.

The fossil impressions are seen on both faces of a thin slab of greenish to grey shaley slate, which, fortunately for the fossils, splits in the plane of bedding. The rock must have originally been of the nature of a fine, slimy, or plastic mud, for the impressions are very well preserved. The slab, in its thickest part, measures only 7 mm. across; yet there are included in it no less than eleven definite layers of variously coloured sediments, ranging from pale olive green to dark bluish green and even to black. The layers are perfectly parallel and indicate an area of quiet deposition, where fine sandy and muddy silt was brought down, probably by a sluggish river, and gently deposited on the estuary or mud-flat.

GENERAL DESCRIPTION OF THE FOSSILS.

The fossil impressions on one face of the rock slab consist of three definite series and run nearly parallel with one another, with more indistinct impressions lying beneath the rock surface as though covered with a thin layer of sediment. The other face, which I take to be the lower in actual position, shows similar impressions, three of which cross one another at acute angles, whilst there are several obscure traces of others in the rock layers above.

It is from the uppermost surface of the slab that we obtain the more definite evidence of the nature of these fossil impressions, for there they seem to be in the nature of positive imprints or partial remains. On the lower side they appear as negative infillings of another layer, with worms of the impressed surface from which the slab was removed.

These fossil remains consist of a double and parallel series of closely set, sharply pointed, bispinose and serrated elements (parapodial) with evidence, in several places, of brushes of setæ, and disposed nearly at right angles to the length of the body. The cleavage of this shale has also exposed what appears to be the impression of the enteric or alimentary canal.

One of the strongest pieces of evidence that we are here dealing with the actual worm impressions and not tracks, is the presence of fine longitudinal striæ along the back of

the parallel body. In one instance the worm-like body shows some fragmentary attached pieces of the superposed shale, as though there had been prominences on the dorsum of the worm which, protruding into the next succeeding layer of mud, caused the adhesion of that layer when clearing the shale, whilst longitudinal grooves indicate the position of the alimentary canal.

The longest fossil impression seen on the slab measures 123 mm., or nearly 5 inches, and its width averages 10 mm., including the parapodial area.

The line of disposition in these fossil worms is a gentle curve to nearly straight. A row of strong bristles ranges along each side of the body of the worm, and these are normally double, giving the pair a bifid character. They are often joined closely at the base, but sometimes more or less free for their greater length. The bristles are curved in most cases and one usually seems longer and stronger than the other. The structure of these bristles was distinctly chitinous, for they have left an extremely strong impression on the shale as compared with the rest of the body.

The larger bristles have a length of 3 mm., the shorter being about 2 mm. or less. A number of the bristles show a decided serrate character. In one small area over one of the fossil impressions there is a bundle of setæ visible, situate just below the strong spear-like spines, and under a strong magnification there are indications of many others.

Magnification of the surface of the shale, in the vicinity of the impressions, shows very distinct, scattered, hair-like bristles, evidently due to the partial disturbance and decomposition of these delicate organisms. Some groups of fine radial striæ adjacent to the organisms may possibly indicate impressions of the branchiæ.

On what I take to be the lower surface of the slab there occurs a delicate impression of an ovoid form with two lateral and forwardly projecting processes. This may possibly represent the head of the worm; and further it agrees in the average dimensions of what we might expect that part of the organism to measure, namely about 5 mm. in diameter.

RELATIONSHIPS.

From the characters of simple and serrated bifid bristles, and the delicate, setose parapodia, as well as the numerous and short segments one may infer a probable relationship with the Family *Amphinomiidæ,* of which the genus *Eurythoe,* amongst others, has a long and slender body. It is instructive, for example, to compare the "Challenger" examples of *Eurythoe pacifica* which that Expedition dredged between tide-marks at Bermuda (1). This living species, which has also been found in the Red Sea, off Nicobar Islands, Tahiti, the Seychelles, and Japan, is described by Prof. W. C. McIntosh as follows (in abbreviation):—

"The body is somewhat flattened and rectangular in " section, slightly pointed in front, and gradually diminished " posteriorly. The specimens are comparatively small, the " longest measuring about 65 mm. with a breadth of 7 mm. " One had 105 body segments. In the living form the " branchiæ commence on the second body segment, each as a " tuft of two processes. The dorsal bristles are either simple " and curved, others with slightly bifid tips, and others again " with serrations. The ventral bristles are bifid with gen- " erally serrations on the inner margin."

As regards undoubted fossil polychætes, these are rare. Dr. E. O. Ulrich (2), in 1879, described from the Cincinnati group (Bala or Upper Ordovician) of the neighbourhood of Cincinnati, a remarkably well preserved tufty structure in considerable numbers, which he regarded as the setæ of marine worms. To this organism, of which no body traces other than the setæ were found, Ulrich gave the new generic and trivial names, *Eotrophonia setigera.*

The nearest examples recorded, however, are those by Dr. C. D. Walcott, under the Genus *Canadia,* from the Middle Cambrian of Burgess County, New Brunswick (3). Although agreeing in characters such as the presence of bundles of setæ, the essential ones separating our specimens are the persistent, curved, and strong bristles, often serrated, and the comparatively short segments and long and slender body.

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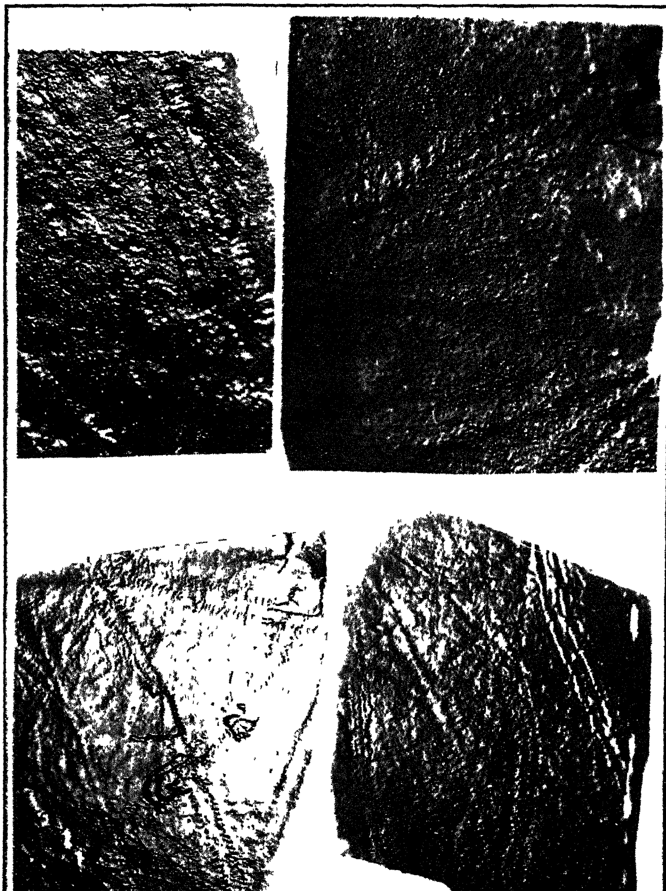
(1) Report "Challenger." Zoology, vol. XII., 1885. *On the Annelida Polychaeta.* W. C. McIntosh. p. 27, pl. II., figs. 3, 4; pl. III., fig. 3; pl. IIA., fig. 3; pl. IIIA., figs. 5-9.

(2) Journ. Cincinnati Soc. Nat. Hist., vol. I., pp. 87-91; pl. IV., figs. 1-5a. April, 1878, to Jan., 1879.

(3) Smithsonian Misc. Collections, vol. LVII., No. 5. Middle Cambrian Annelids. pp. 117-120; pl. XXIII., figs. 1-7.



Tasmanadia twelvetreesi (Chapman).

DESCRIPTION OF TASMANIAN SPECIMENS.

Subclass POLYCHÆTA.

Fam. TASMANADIIDÆ, *nov.*

Genus *Tasmanadia, nov.*

Generic Characters.—Polychætes with long and slender bodies, formed of numerous short segments; bearing pairs of parapodial bristles, sometimes serrated, and carrying bundles of setæ. (?) Head, comparatively small, ovoid, tapering in front.

Tasmanadia Twelvetreesi (4), *sp. nov.* Plate I.

Body long and slender, parallel-sided, gently and sinuously curved. Segments numerous, as many as 56 on the longest specimen, which has a length of 123 mm. The parapodia carry each two bristles, often serrated, whilst bunches of setæ are seen on the best preserved specimens. The transverse traces of the segments are difficult to decipher, but are seen on the crushed specimens. Indistinct traces of what appears to be the head occurs on the underside of one slab, which is apparently ovoid and tapering. Width of body, circ. 10 mm. (including parapodia). Length of bristles from the base of the body, 3.75 mm.

Horizon.—Probably Cambrian.

Locality.—Kirkup's Quarry, Arthur River, Tasmania.

Holotype in Geological Survey Museum, Hobart.

(4) Named in honour of the late Mr. W. H. Twelvetrees, F.G.S., Government Geologist of Tasmania, who presented me with a similar specimen some years ago.

THE MARINE ALGÆ OF TASMANIA.

A Classified List of the Algæ which have been recorded from Tasmania and the adjacent Islands.

By

A. H. S. Lucas, M.A., B.Sc.

(Read 12th March, 1928.)

This Record is based on the labours of many workers.

Probably the first Tasmanian seaweed to receive a scientific name was the largest, though not the longest, of them all, the giant kelp, *Sarcophycus potatorum*, gathered during the survey of the Huon River and D'Entrecasteaux Channel made by the *Rechêrche* and the *Espérance* in 1792-3. The specific name was given to it by the French botanist Labillardière, who observed that the natives of Tasmania " used portions of its great leaves folded into the form of " a pouch, for the purpose of keeping fresh water."

Robert Brown, the "Botanicorum Princeps" of his day, as naturalist of the Expedition of Captain Flinders, spent some time in Tasmania, 1804, and, while making his great collections of land plants, did not neglect the seaweeds. He described and named a number of species, especially amongst the *Fucoideæ*.

Dr., afterwards Sir Joseph, Hooker was the naturalist of the Expedition of Sir James Ross with the *Erebus* and *Terror*, 1839-43. He stayed in Hobart as the guest of Sir John and Lady Franklin, and doubtless gathered the seaweeds as well as the land plants, in preparation for his proposed *Flora of Tasmania.* The Hookers, Sir William and (Sir) Joseph, were fortunate in securing the aid of the keen and accomplished local naturalists, Ronald Gunn and William Archer, to whom the *Flora*, when published, was dedicated. They collected far and wide, by land and by sea, and forwarded their collections to Kew.

In 1847 Professor W. H. Harvey, of Trinity College, Dublin, published his *Nereis Australis* on the Algæ of the Southern Ocean. Harvey worked in close conjunction with the Hookers, and described in the *Nereis*, with many coloured plates, the Algæ obtained by Hooker in the Antarctic voyage. Amongst these several of the Tasmanian plants are figured.

In 1854-5 Harvey made his celebrated voyage—*illud iter*, as Agardh admiringly calls it—to Ceylon, Australia, and the Friendly Islands in quest of Algæ, making prodigious collections. At George Town he was the guest of the Rev. John and Mrs. Fereday, who entered heart and soul into his project. Mr. Fereday had already discovered the haunts of *Claudea* and other beautiful algæ for which the Tamar is famed, and both he and Mrs. Fereday laboured day after day with Harvey, gathering and mounting "thousands of " specimens." Harvey went on to Port Arthur and collected there.

The results of Harvey's voyage to Australia and Tasmania were embodied in his magnificent work, the *Phycologia Australica*, issued in five volumes, 1858-63. Harvey was our greatest British phycologist and possessed conspicuous artistic ability, and in the 300 coloured plates of the work many of the Tasmanian algæ are beautifully delineated. Two of the volumes are appropriately dedicated to Ronald Gunn and the Rev. John Fereday respectively.

During the publication of the *Phycologia*, Dr. Hooker's *Flora of Tasmania* appeared, in 1860. In this work Harvey dealt with the algæ and gave further descriptions and figures of Tasmanian plants, using his own material as well as that supplied by Gunn and Archer to Hooker, and collections made by C. Stuart at Southport and Dr. Jeannerett at Port Arthur. In the *Flora* 300 marine algæ are enumerated, 22 *Chlorophyceæ*, 60 *Phæophyceæ* and 218 *Rhodophyceæ*.

In 1874 G. Zanardini, a well-known Italian phycologist, published a paper *Phyceæ Australasicæ novæ vel minus cognitæ* (*Flora*). He described Tasmanian plants, especially those collected by Mrs. Goodwin at George Town. Several of his species require verification and elucidation.

In his various works 1860-94 the great Swedish phycologist J. G. Agardh recorded and described other Australian and Tasmanian plants. To him Mrs. L. A. Meredith consigned the algæ she had collected during her residence at Orford.

Lastly, G. B. de Toni in his monumental work, the *Sylloge Algarum*, has given a complete account of the algæ of the world, with full descriptions of all known species arranged according to the most recent classification.

I have been engaged in my leisure time for many years in the study of Australian, including Tasmanian, marine algæ, and have had the opportunity of investigating several

valuable collections of Tasmanian forms. In the National Herbarium, Sydney, the algæ of which are under my care, we have fortunately two of the sets of *Algæ Australicæ exsiccatæ*, providing some 600 species distributed and named by Harvey. In addition there are a good many plants, usually not named, gathered by W. Archer and Samuel Hannaford. Professor Ewart, of Melbourne, while Government Botanist of Victoria, sent me a considerable collection made by Mrs. Spong in King Island. Mr. Quaife gave me a large collection of well selected and mounted plants mostly from the Tamar. Mr. L. Rodway generously handed over to me his very large collection, gathered in many years and from many localities, but chiefly from the South. Mrs. F. Perrin, of Launceston, also very kindly gave me the freest use of the plants she had gathered at Low Head. I have examined the collections in the Hobart Museum by the courtesy of Mr. Clive Lord and those in the Launceston Museum by favour of Mr. Scott. I have also worked several days in the National Herbarium, Melbourne, which possesses the algæ of Sonder's herbarium.

In my two years' residence in Tasmania, and in previous and later visits, I have been enabled to study the weeds in their natural habitats, and have made full collections in the Derwent and Channel and in the Tamar, as well as at Burnie, Ulverstone, Orford, Eaglehawk, Port Arthur, and Port Esperance. Mrs. Perrin and I have dredged in the Tamar, and I also used the dredge in the Derwent and Channel and Ports Arthur and Esperance. Mrs. Perrin has from time to time forwarded packets from Low Head, Mr. Lord from Bruny and the Derwent, Mr. C. Davis from Dover, and Mr. Ernest Mawle from Port Arthur.

The above then have constituted the sources of my information. I have endeavoured to make the List as complete as possible and as accurate. Freshwater algæ and the *Cyanophyceæ* have not been included, as our knowledge of these forms is, so far, meagre and fragmentary. The list includes 44 *Chlorophyceæ*, 90 *Phæophyceæ*, and 284 *Rhodophyceæ*, in all 418 species. The arrangement followed is that of De Toni in the *Sylloge Algarum*.

Most of the Tasmanian algæ occur on both sides of Bass Strait. A few are also found in New Zealand. A very few, as *Ulva*, *Enteromorpha*, *Dictyota dichotoma*, *Cladostephus spongiosus*, are cosmopolitan. I have marked with an asterisk those species which, so far as is known at present, are endemic.

CHLOROPHYCEÆ (Ag.), Falk.

Family 1. ULVACEÆ (Lamour.), Rabenh.

Ulva, L.

U. lactuca, L. *Passim.*
U. lætevirens, Aresch.

Enteromorpha, Link.

**E. gunniana*, J. Ag. Thouin Bay, East Coast (Rodway).
E. flexuosa (Wulf.), J. Ag.
E. prolifera (Muell.), J. Ag.
E. intestinalis (L.), Link.
E. linza (L.), J. Ag.
E. compressa (L.), Grev.
E. bulbosa (Suhr), Kuetz.
E. lingulata, J. Ag.
E. clathrata (Roth), J. Ag.
E. ramulosa, Hook.
E. acanthophora, Kuetz.

Family 2. CLADOPHORACEÆ (Hassall), Wittrock.

Chætomorpha, Kuetz.

C. darwinii (Hook.), Kuetz. *Passim.*
C. coliformis (Mont.), Kuetz. Southport (Stuart).
C. valida (H. & H.), Kuetz.
C. aerea (Dillw.), Kuetz.

Cladophora, Kuetz.

C. pellucida (Huds.), Kuetz.
**C. stuartii*, Harv.
C. bainesii, Harv. Tamar.
C. gracilis (Griff.), Kuetz.
**C. gracillima*, Harv.
**C. feredayi*, Harv. Tamar; Derwent.
**C. ferruginea*, Harv.

Dictyosphæria, Dene.

D. sericea, Harv.

Harvey in *Flor. Tasm.* writes "I venture to in-"troduce this plant as *probably* occurring on the "outer coasts of T." I know of no positive record.

Apjohnia, Harv.

A. lætevirens, Harv. Reminé (Rodway).

Family 3. BRYOPSIDACEÆ (Bory), Thur.

Bryopsis, Lamour.

B. plumosa (Huds.), Ag. *Passim.*
B. hypnoides, Lamour. Eaglehawk (Rodway).

Family 4. CAULERPACEÆ, Reichb.

Caulerpa, Lamour.

C. scalpelliformis (R. Br.), Ag.
C. trifaria, Harv. Port Esperance; Channel (Lucas); Orford (Mrs. Meredith).
C. harveyi, F.v.M. North Coast.
C. sonderi, F.v.M. North Coast.
C. brownii, Endl. *Passim.*
**C. flexilis*, Lamour.
C. hypnoides (R. Br.), Ag.
C. muelleri, Sond. *Passim.*
C. sedoides (R. Br.), Ag. *Passim.*
C. vesiculifera, Harv.
C. simpliciuscula, Ag.
C. cactoides (Turn.), Ag. *Passim.* Dredged 20 fm. at Actæon Islands (Rodway).

Codium, Stackh.

C. bursa (L.), Ag. Derwent (Lucas).
C. muelleri, Kuetz. North Coast.
C. galeatum, J. Ag. Derwent (Rodway).
C. mucronatum, J. Ag. *Passim.*

FUCOIDEÆ (Ag.), J. Ag.

=PHÆOPHYCEÆ (Thur.), Kjellm.

Order 1. CYCLOSPORINÆ, Aresch.

Family 1. SARGASSACEÆ, Decaisne.

Sargassum, Ag.

Subgenus *Phyllotricha* (Aresch.), J. Ag.

S. heteromorphum, J. Ag. Low Head (Lucas).
S. sonderi, J. Ag. Low Head; Derwent.
S. muriculatum, J. Ag. T., King Island (Mrs. Spong).
S. varians, Sond. Low Head (Lucas).
S. decipiens (R. Br.), J. Ag. South Arm (Lucas).
S. verruculosum (Mert.), Ag. Channel; Port Esperance; Port Arthur.

Subgenus *Arthrophycus*, J. Ag.

S. bracteolosum, J. Ag. Burnie.
S. lævigatum, J. Ag.
S. paradoxum (R. Br.), Harvey. Orford.
S. vestitum (R. Br.), Ag. Kent Islands; Burnie; Derwent.
**S. rhyncophorum*, J. Ag.

*S. *gunnianum,* J. Ag. Low Head (Lucas).
S. *grande,* J. Ag. Port Esperance.
S. *undulatum,* J. Ag.
S. *membranaceum,* J. Ag.

Subgenus *Eu-Sargassum,* J. Ag.

So far, no forms belonging to this Section of the genus, which is dominant in the North, have been definitely recorded from Tasmania.

Seirococcus, Grev.

S. *axillaris* (R. Br.), Grev. *Passim.*

Scytothalia, Grev.

S. *dorycarpa* (Turn.), Grev. Kent Islands.
This record of R. Brown's needs to be verified in the case of a plant which is typically West Australian, and has not been found in Victoria.

Cystophora, J. Ag.

C. *uvifera* (Ag.), J. Ag.
C. *cephalornithos* (Lab.), J. Ag. Maria Island (Rodway).
C. *platylobium* (Mert.), J. Ag.
*C. *xiphocarpa,* Harv. Port Arthur (Harvey); Muddy Plains (Rodway); Brown's River; Southport.
C. *scalaris,* J. Ag.
C. *retorta* (Mert.), J. Ag.
C. *retroflexa* (Labill.), J. Ag. *Passim.*
C. *siliquosa,* J. Ag. Burnie.
C. *torulosa* (R. Br.), J. Ag. Devonport; Southport (Rodway); Swansea.
C. *grevillei* (Ag.), J. Ag.
This species, recorded from Herb. Zanardini, requires verification. It is a West Australian form.
C. *spartioides* (Turn.), J. Ag. *Passim.*
C. *monilifera,* J. Ag.
C. *paniculata* (Turn.), J. Ag. *Passim.*

Cystophyllum, J. Ag.

C. *muricatum* (Turn.), J. Ag.

Scaberia, Grev.

S. *agardhii,* Grev. North Coast.
S. *rugulosa,* J. Ag. (sec. Harvey.)

Phyllospora, Ag.

P. *comosa* (Labill.), Ag.

Carpoglossum, Kuetz.

C. *confluens* (R. Br.), Kuetz.

Family 2. Fucaceæ (Lamour.), Kjellm.

Hormosira, Endl.

H. banksii (Turn.), Decaisne.

Myriodesma, Decaisne.

M. integrifolium, Harv. Ulverstone; Tamar.

Xiphophora, Mont.

X. billardieri, Mont.
X. chondrophylla (R. Br.), Mont.

Family 3. Durvilleæaceæ, Olt.

Sarcophycus, Kuetz.

S. potatorum (Labill.), Kuetz.

Splanchnidium, Grev.

S. rugosum (L.), Grev.

Notheia, Bail. & Harv.

N. anomala, Bail. & Harv.
The only known parasitic Tasmanian alga.

Order 2. TETRASPORINÆ, De Toni.

Family 1. Dictyotaceæ (Lamour.), Zan.

Zonaria (Draparn.), J. Ag.

Z. turneriana, J. Ag.

Homœostrichus, J. Ag.

H. stuposus (R. Br.), J. Ag. Kent Islands.

Haliseris, Targ.-Tozz.

H. muelleri, Sond.
H. acrostichoides, J. Ag.

Dictyota, Lamour.

D. vittarioides, J. Ag. King Island (Mrs. Spong).
D. nigricans, J. Ag. Orford.
D. dichotoma (Huds.), Lamour. *Passim.*
D. ocellata, J. Ag.
D. diemensis, Sond. George Town; Channel (Rodway).

Pachydictyon, J. Ag.

P. paniculatum, J. Ag. *Passim.*

Dilophus, J. Ag.

D. gunnianus, J. Ag.
D. fasciculatus, J. Ag.
D. tæniæformis, J. Ag. Low Head (Mrs. Perrin).

Order 3. PHÆOZOOSPORINÆ, Thuret.

Family 1. CUTLERIACEÆ, Zan.

Cutleria, Grev.

C. multifida (Sm.), Grev.

Family 2. LAMINARIACEÆ (Bory), Rostaf.

Adenocystis, H. & H.

A. lessonii, Hook. & Harv. Port Arthur (Harvey).

Ecklonia, Hornem.

E. radiata (Turn.), J. Ag. *Passim.*

Macrocystis, Ag.

M. pyrifera (Turn.), Ag. *Passim.*

Family 3. SPOROCHNACEÆ (Reichb.), Dcne.

Bellotia, Harv.

B. eriophorum, Harv. N. Coast (Lucas); Dredged 20 fm. Actæon Islands (Rodway).

Perithalia, J. Ag.

P. inermis (R. Br.), J. Ag. *Passim.*

Sporochnus, Ag.

S. comosus, Ag. *Passim*, especially North Coast.

**S. herculeus*, J. Ag. George Town.

S. radiciformis (R. Br.), Ag. Derwent (Rodway).

**S. apodus*, Harv. George Town.

The two George Town plants, both extremely rare, may be abnormal forms of *S. comosus*, which grows abundantly in the Tamar.

Family 4. STILOPHORACEÆ (Naeg.), De Toni & Levi.

Stilophora, J. Ag.

**S. australis*, Harv. Widely distributed.

Family 5. CHORDARIACEÆ (Ag.), Zan.

Myrionema, Grev.

**M. leclancherii* (Chauv.), Harv. Frequent on *Ulva.*

Eudesme, J. Ag.

E. australis (Harv.), J. Ag. Low Head; Orford.

Bactrophora, J. Ag.

B. vermicularis, J. Ag. Eaglehawk (Rodway).

B. nigrescens (Harv.), J. Ag.

Myriocladia, J. Ag.

M. sciurus, Harv. Derwent (Rodway).

Polycerea, J. Ag.

**P. ramulosa*, J. Ag.

Leathesia, Gray.

L. difformis (L.), Aresch. Low Head; Ulverstone.

Liebmannia, J. Ag.

**L. harveyana*, J. Ag. Ulverstone (Lucas).

Chordaria, Ag.

C. cladosiphon, Kuetz. *Passim.*

C. incurvata, J. Ag. Perhaps a form of the preceding.

Family 6. ELACHISTACEÆ, Kjellm.

Elachista, Duby.

E. australis, J. Ag. Derwent (Rodway).

Family 7. DICTYOSIPHONACEÆ (Kuetz.), Thur.

Scytothamnus, H. & H.

S. australis (J. Ag.), H. & H. Low Head (Lucas).

Family 8. STRIARIACEÆ, Kjellm.

Stictyosiphon, Kuetz.

S. decaisnei (H. & H.), Murray.

Family 9. ENCŒLIACEÆ (Kuetz.), Kjellm.

Scytosiphon, Ag.

S. lomentarius (Lyngb.), J. Ag. *Passim.*

Phyllitis, Kuetz.

P. fascia (Muell.), Kuetz. Tamar (Quaife).

Colpomenia, Derb. & Sol.

C. sinuosa (Roth), Derb. & Sol. *Passim.*

Asperococcus, Lamour.

A. bullosus, Lamour. *Passim.*

Family 10. SPHACELARIACEÆ (Dcne), Kuetz.

Cladostephus, Ag.

C. spongiosus (Lightf.), Ag. *Passim.*

Stypocaulon, Kuetz.

S. paniculatum (Suhr), Kuetz. *Passim.*

Xanthosiphonia, J. Ag.

X. wattsii, J. Ag. Tamar (Mrs. Perrin); Port Arthur (Lucas).

Family 11. ECTOCARPACEÆ (Ag.), Kuetz.

Ectocarpus, Lyngb.

E. siliculosus (Dillw.), Lyngb.
E. fasciculatus (Griff.), Harv. T. (Harvey).
**E. sordidus*, Harv. George Town.

FLORIDEÆ, Lamour.

=*Rhodophyceæ*, Ruprecht.

Subclass 1. BANGOIDEÆ, De Toni.

Family 1. BANGIACEÆ (Zan.), Berth.

Bangia, Lyngb.

**B. ciliaris*, Carm. Subspecies *B. pulchella*, Harv. George Town (Harvey).
B. atropurpurea (Roth), Ag. Derwent.

Porphyra, Ag.

**P. woolhousiæ*, Harv.

Wildemania, De Toni.

W. laciniata (Lightf.), De Toni. *Passim.*

Subclass 2. EU-FLORIDEÆ, De Toni.

Order 1. NEMALIONINÆ, Schmitz.

Family 1. HELMINTHOCLADIACEÆ (Harv.), Schmitz.

Batrachospermum, Roth.

B. moniliforme, Roth.
B. dillenii, Bory. Esk.
B. vagum, Ag.
B. sp.* Eve River, tributary of Gordon River (Mrs.** Perrin).

Gulsonia, Harv.

G. annulata, Harv. George Town (Harvey).

Helminthocladia, J. Ag.

H. densa (Harv.), Schmitz. Tamar; Ulverstone (**Mrs.** Perrin).

Liagora, Lamour.

L. viscida (Forsk.), Ag. George Town (Harvey).

Family 2. CHÆTANGIACEÆ, Schmitz.

Scinaia, Bivona.

S. furcellata, Turn. Bivona.

Chætangium, Kuetz.

**C. lingula*, Harv. Brown's River (Gunn); Huon (Rodway); Eaglehawk (Lucas).
**C. flabellatum*, Harv. Port Arthur (Harvey).

Family 3. GELIDIACEÆ (Kuetz.), Schmitz.

Wrangelia, Ag.

W. mucronata, Harv.
**W. gunniana*, J. Ag.
**W. jeannerettii*, H. & H. Port Arthur (Harvey).
W. protensa, Harv. George Town (Harvey).
W. crassa, H. & H. George Town (Gunn).
**W. ballioides*, J. Ag. Tamar (Mrs. Perrin).
**W. nobilis*, Harv. Tamar. Abundant.
**W. setigera*, Harv. Tamar (Harvey); Port Esperance (Lucas).
W. plumosa, Harv. *Passim.*

Gelidium, Lamour.

G. australe, J. Ag.
G. glandulæfolium, H. & H.

Order 2. GIGARTININÆ, Schmitz.

Family 1. GIGARTINACEÆ, Schmitz.

Ectoclinium, J. Ag.

E. dentatum, J. Ag.

Iridæa, Bory.

I. australasica, J. Ag.
**I. foliifera*, Harv.
**I. harveyi*, J. Ag.
**I. polycarpa*, Harv.
I. prolifera, J. Ag.
**I. purpurea*, J. Ag.
(?) *I. latissima* (H. & H.), Grunow. A New Zealand form.

Gigartina, Stackhouse.

G. brachiata, Harv. George Town (Harvey).
**G. aciculifera*, Zan. Derwent (Rodway).
**G. binderi*, Harv. Hobart (Binder Herb.); Burnie (Lucas).
G. flabellata, J. Ag.
G. pinnata, J. Ag. *Passim.*
G. congesta, Zan.
G. livida, J. Ag. A very doubtful species.
**G. ancistroclada*, Mont. Derwent (Gunn, Rodway).
G. gigantea, J. Ag.
G. radula, J. Ag.

Stenogramma, Harv.

S. interruptum (Ag.), Mont. Derwent (Lucas).

Gymnogongrus, Mart.

**G. fastigiatus*, Harv. Forester's River (Gunn).

Mychodea, Harv.

M. terminalis, Harv. Tamar (Harv.).

M. membranacea, Harv.

M. carnosa, Harv. Tamar (Lucas).

M. hamata, Harv. *Passim.*

**M. disticha*, Harv. East Coast (Gunn).

Callophyllis, Kuetz.

C. harveyana, J. Ag.

C. lambertii (Turn.), Grev. North Coast.

C. coccinea, Harv. *Passim.*

Polycœlia, J. Ag.

**P. fastigiata*, Harv. Tamar (Harvey).

Callymenia, J. Ag.

C. cribrosa, Harv. Tamar (Fereday).

C. tasmanica, Harv. Tamar (Harvey).

Meredithia, J. Ag.

M. polycœlioides, J. Ag.

Family 2. RHODOPHYLLIDACEÆ, Schmitz.

Meristotheca, J. Ag.

**M. tasmanica*, J. Ag. Orford (Mrs. Meredith).

Rhodophyllis, Kuetz.

R. membranacea, Harv.

R. gunnii, Harv. Tamar (Mrs. Perrin, Lucas).

R. multipartita, Harv.

**R. goodwiniæ*, J. Ag. Tamar (Mrs. Goodwin).

R. hypneoides, Harv.

Erythroclonium, Sonder.

E. muelleri, Sond. Actæon Islands, 20 fm. (Rodway).

Rhabdonia, Harv.

R. nigrescens, Harv.

R. coccinea, Harv.

R. verticillata, Harv. Tamar (Harvey); Channel (Lucas); Orford (Mrs. Meredith).

**R. umbellata*, Zan.

**R. compressa*, J. Ag.

Eucheuma, J. Ag.

E. speciosum (Sond.), J. Ag. T. (Sonder record).

Areschougia, Harv.

A. laurencia (H. & H.), Harv.

A. stuartii, Harv. Southport (Stuart); Port Esperance (Lucas).

Order 3. RHODYMENINÆ, Schmitz.

Family 1. SPHÆROCOCCACEÆ (Dum.), Schmitz.

Phacelocarpus, Endl. & Dies.

P. complanatus, Harv. Southport (Stuart).
P. alatus, Harv.
P. labillardieri (Mert.), J. Ag. *Passim.*

Nizymenia, Sond.

N. australis, Sond.

Trematocarpus, Kuetz.

**T. concinnus* (R. Br.), J. Ag. Kent Islands (R. Brown).

Melanthalia, Mont.

M. obtusata (Labill.), J. Ag.

Curdiea, Harv.

C. laciniata, Harv. Orford (Mrs. Meredith).
**C. meredithiæ*, J. Ag. Orford (Mrs. Meredith).

Gracilaria, Grev.

G. confervoides (L.), Grev. Derwent (Rodway, Lucas).
**G. spinescens* (Kuetz.), J. Ag. Doubtfully identical.

Hypnea, Lamour.

H. episcopalis, H. & H. *Passim.*
H. seticulosa, J. Ag. *Passim.*

Rhododactylis, J. Ag.

**R. bulbosa* (Harv.), J. Ag.

Family 2. RHODYMENIACEÆ (Naeg.), J. Ag.

Gloioderma, J. Ag.

=*Horea*, Harv.

G. australe, J. Ag.=Horea *polycarpa*, Harv.
G. tasmanicum, Zan.=*Horea speciosa*, Harv.

Hymenocladia, J. Ag.

H. polymorpha (Harv.), J. Ag.

Rhodymenia, Grev.

R. foliifera, Harv.
R. linearis, J. Ag.
**R. prolificans*, Zan.
**R. pinnulata*, Zan.

Epymenia, Kuetz.

E. halymenioides, J. Ag. Channel (Lucas); Orford (Mrs. Meredith).
**E. cuneata* (Harv.), J. Ag. East Coast (Gunn); Port Esperance (Lucas).

E. membranacea, Harv. Southport (Stuart).

Halichrysis (Schousb.), Schmitz.

H. meredithiana (J. Ag.), De Toni. Orford (Mrs. Meredith).

Chrysymenia, J. Ag.

C. obovata, Sond.

C. brownii (Harv.), J. Ag. Tamar; Ulverstone; Channel (Lucas).

**C. coccinea*, Harv. Van Diemen's Land (Harvey).

Bindera, Harv.

B. saceata (Harv.), J. Ag. George Town (Archer).

Champia, Desv.

C. parvula (Ag.), J. Ag.

C. affinis (H. & H.), J. Ag. *Passim.*

C. obsoleta, Harv.

C. tasmanica, Harv.

Chylocladia, Grev.

C. clavellosa (Turn.), Grev. George Town (Harvey).

Plocamium, Lamour.

P. leptophyllum, Kuetz. The Australian form of *P. coccineum* (Huds.), Lyngb.

P. flexuosum (J. Ag.), Lucas. *Passim.* =*P. leptophyllum* var. *flexuosum*, J. Ag.

P. angustum (J. Ag.), H. & H. *Passim.*

P. costatum (J. Ag.), H. & H.

**P. gracile*, J. Ag.

P. mertensii (Grev.), Harv. *Passim.*

P. procerum (J. Ag.), Harv. *Passim.*

**P. dilatatum*, J. Ag.

Family 3. DELESSERIACEÆ (Naeg.), Schmitz.

Martensia, Hering.

M. australis, Harv. T. (Gunn, Fereday).

**M. gigas*, Harv. Tamar (Harvey).

Nitophyllum, Grev.

N. crispum (Kuetz), J. Ag. Esp. North Coast.

N. gunnianum, Harv.

N. endivæfolium (H. & H.), J. Ag.

**N. gattyanum*, J. Ag. Derwent (Lucas).

N. affine, Harv.

N. multipartitum, H. & H.

N. polyanthum, J. Ag.

N. curdieanum, Harv. Tamar (Lucas).

Platyclinia, J. Ag.

P. stipitata (Harv. ?), J. Ag. T. (Gunn, Mrs. Meredith).

Hypoglossum, Kuetz.

H. heterocystideum, J. Ag. Channel (Rodway).

Phitymophora, J. Ag.

P. imbricata, J. Ag. *Passim.*

Apoglossum, J. Ag.

A. ruscifolium (Turn.), J. Ag. Tamar (Lucas, Mrs. Perrin).

**A. tasmanicum* (F.v.M.), J. Ag. Ralph's Bay (Rodway); Tamar (Harvey); Port Esperance (Lucas).

Hemineura, Harv.

H. frondosa, Harv. *Passim.*

H. wilsonis, J. Ag. Tamar (Lucas, Mrs. Perrin).

Halicnide, J. Ag.

H. similans, J. Ag. Tamar (Harvey).

Caloglossa, Harv.

C. leprieurii (Mont.), J. Ag.

Sarcomenia, Sond.

S. dasyoides, Harv. Ulverstone (Lucas).

Sonderella, Schmitz.

S. linearis (Harv.), Schmitz. Prob. Tamar (Quaife).

Claudea, Lamour.

C. elegans, Lamour. Tamar (Harvey, Fereday).

Family 4. BONNEMAISONIACEÆ (Trev.), Schmitz.

Leptophyllis, J. Ag.

L. conferta (R. Br.), J. Ag. Southport (Rodway).

Ptilonia, J. Ag.

P. australasica, Harv. Port Esperance (Lucas).

**P. intermedia*, Lucas. Channel (Rodway).

Delisea, Lamour.

D. elegans (Ag.), Mont. North Coast.

D. hypneoides, Harv. Tamar (Mrs. Perrin).

D. pulchra (Grev.), Mont.

Asparagopsis, Mont.

A. armata, Harv. Tamar (Mrs. Perrin); Eaglehawk (Lucas).

Family 5. RHODOMELACEÆ (Reichb.), Harv.

Subfamily 1. LAURENCIEÆ (Harv.), Zan.

Laurencia, Lamour.

L. filiformis (Ag.), Mont.
L. forsteri (Mert.), Grev.
L. heteroclada, Harv. King Island (Mrs. Spong).
L. obtusa (Huds.), Lamour. *Passim.*
L. tasmanica, H. & H. Tamar; Eaglehawk (Lucas); Maria Island (Rodway).
L. botryoides (Turn.), Gaill. Derwent; Huon (Rodway).
L. elata (Ag.), Harv. *Passim.*

Subfamily 2. CHONDRIEÆ (Kuetz.), Schmitz.

Cœloclonium, J. Ag.

C. verticillatum (Harv.), J. Ag. Tamar (Lucas, Mrs. Perrin).
C. incrassatum, J. Ag. (Mrs. Meredith.)

Dolichoscelis, J. Ag.

D. clavifera, J. Ag. (Mrs. Meredith.)

Chondria, Ag.

C. fusifolia, Hook. & Harv. Huon (Rodway); Derwent (Lucas).
C. debilis, Harv. Tamar (Gunn).
C. harveyana, J. Ag. Channel (Rodway).

Subfamily 3. POLYSIPHONIEÆ (Kuetz.), Schmitz & Falk.

Lophurella, Schmitz.

L. periilados (Sond.), Schmitz. Derwent (Rodway).

Falkenbergia, Schmitz.

F. vagabunda (Harv.), Falk. Eaglehawk (Harvey).

Polysiphonia, Grev.

Section 1. *Oligosiphonia*, J. Ag. 4 siphons.

P. mollis, H. & H. *Passim.*
**P. succulenta*, Harv. One specimen, George Town (Gunn).
P. abscissa, H. & H. Ulverstone; Port Esperance (Lucas).
**P. laxa*, Harv. East Coast (Gunn).
**P. crassiuscula*, Harv. East Coast (Gunn).
P. ferulacea, Suhr. Table Cape (Miss Mackenzie); Burnie (H. J. Carter).
**P. macrarthra*, Zan. George Town (Mrs. Goodwin).
**P. flavescens*, Zan. George Town (Mrs. Goodwin).

**P. spinuligera*, Zan. George Town (Mrs. Goodwin).
P. hookeri, Harv. *Passim.*
P. hystrix, H. & H. *Passim.*
P. mallardiæ, Harv. Snug (Lucas).
**P. dasyoides*, Zan. George Town (Mrs. Goodwin).

Section 2. *Polysiphonia*, J. Ag.

P. frutex, Harv. }
P. cancellata, Harv. } *Passim.* Hardly distinguishable.
P. fuscescens, Harv. Southport (Rodway).

Bryocladia, Schmitz.

**B. ericoides* (Harv.), Schmitz. Eaglehawk (Lucas).

Pityopsis, Falk.

**P. tasmanica* (Sond.), Falk. George Town (Harvey).

Chiracantha, Falk.

**C. arborea* (Harv.), Falk. Tamar (Harvey).

Subfamily 4. PTEROSIPHONEÆ, Falk.

Pollexfenia, Harv.

P. pedicellata, Harv. *Passim.*
P. lobata (Lamour), Falk. *Passim.*

Dictymenia, Grev.

D. harveyana, Sond. *Passim.*
**D. myriacantha*, Kuetz. George Town (Harvey).

Subfamily 5. LOPHOTHALIEÆ, Schmitz & Falk.

Brongniartella, Bory.

B. australis (Ag.), Schmitz. Tamar (Mrs. Perrin).
B. patersonis (Sond.), De Toni. (C. Stuart.)
B. sarcocaulon (Harv.), Schmitz. North Coast (sec. J. G. Agardh).
**B. feredayæ* (Harv.), De Toni. George Town (Mrs. Fereday).

Lophiothalia, Kuetz.

**L. verticillata* (Harv.), Kuetz. George Town (Harvey).
L. hormoclados, J. Ag. Tamar (Harvey).

Doxodasya, Schmitz.

D. bolbochæte (Harv.), Falk. George Town (Harvey).

Subfamily 6. POLYZONIEÆ, Schmitz.

Euzoniella, Falk.

E. incisa (J. Ag.), Falk. North Coast.

Subfamily 7. HERPOSIPHONIEÆ, Schmitz & Falk.

Herposiphonia, Naegeli.

H. versicolor (H. & H.), Falk. *Passim.*
**H. monilifera* (H. & H.), Falk. (Gunn.)

Herpopteros, Falk.

H. fallax, Falk.

Subfamily 8. RYTIPHLŒEÆ (Dene), Kuetz.

Lenormandia, Sond.

L. marginata, H. &. H. *Passim.*
L. prolifera (Ag.), J. Ag.
L. smithiæ (H. & H.), Falk.

Subfamily 9. BOSTRYCHIEÆ, Falk.

Bostrychia, Mont.

B. mixta, H. & H. Port Arthur (Harvey).
B. harveyi, Mont. (C. Stuart.)

Subfamily 10. DASYEÆ (Kuetz.), Schmitz & Falk.

Dasya, Ag.

D. hapaalthrix, Harv. George Town (Harvey).
**D. meredithiæ*, J. Ag. (Mrs. Meredith.)
D. haffiæ, Harv. Table Cape (sec. Harvey).
D. naccarioides, Harv. *Passim.*
**D. tasmanica*, Sond. George Town (Harvey).
D. capillaris, H. &. H. Tamar (Harvey).
D. villosa, Harv. *Passim.*
D. urceolata, Harv. Derwent (Rodway).
D. ceramioides, Harv. Huon; Actæon Islands, 20 fm. (Rodway).
**D. feredayæ*, Harv. George Town (Mrs. Fereday).

Heterosiphonia, Mont.

**H. archeri* (Harv.), De Toni. George Town (W. H. Archer).
H. gunniana (Harv.), Falk. *Passim.*
H. muelleri (Sond.), De Toni. Ulverstone; Tamar (Mrs. Perrin).

Family 6. CERAMIACEÆ (Bonnem.), Naeg.

Subfamily 1. SPERMOTHAMNIEÆ, Schmitz.

Spermothamnion, Aresch.

S. turneri (Mert.), Aresch. (sec. Harvey.)

Subfamily 2. GRIFFITHSIEÆ, Schmitz.

Griffithsia, Ag.

**G. gunniana*, J. Ag. (Gunn.)
**G. flabelliformis*, Harv.
G. monile, Harv. Bellerive (Rodway).
**G. gracilis*, Harv. George Town (Harvey).

Subfamily 3. MONOSPOREÆ, Schmitz.

Bornetia, Thuret.

B. antarctica (H. & H.), De Toni.
B. meredithiana, J. Ag. Orford (Mrs. Meredith).

Monospora, Solier.

M. arachnoides (Harv.), J. Ag.
M. griffithsioides (Sond.), De Toni.
M. elongata (Harv.), De Toni.

Pleonosporium, Naeg.

P. comatum (J. Ag.), De Toni.

Subfamily 4. CALLITHAMNIEÆ (Kuetz.), Schmitz.

Callithamnion, Lyngb.

**C. fastigiatum*, Harv. George Town (Gunn).
C. laricinum, Harv.

Seirospora, Harv.

S. byssoides (Arnott), De Toni, var. *caulescens*, J. Ag.

Subfamily 5. SPONGOCLONIEÆ, Schmitz.

Spongoclonium, Sond.

S. latissimum (H. & H.), De Toni. North Coast.
S. angustatum (H. & H.), De Toni. George Town (Harvey).
**S. violaceum* (Harv.), De Toni. Tamar (Harvey); Derwent (Lucas).
S. scoparium, J. Ag. Orford (Mrs. Meredith).
S. paradoxum (Harv.), De Toni. Derwent (Lucas).

Haloplegma, Mont.

H. preissii, Sond. North Coast.

Warrenia (Harv. MS.), Kuetz.

W. comosa, Harv. Tamar (Harv.); Derwent (Rodway).

Subfamily 6. PTILOTEÆ, Cramer.

Euptilota, Kuetz.

E. articulata (J. Ag.), Schmitz. *Passim.*
E. coralloidea (J. Ag.), Kuetz. King Island (Mrs. Spong).
E. jeannerettii (Harv.), Schmitz. Port Arthur (Dr. Jeannerett); Southport (Stuart).

Rhodocallis, Kuetz.

R. elegans, Kuetz. Southport (Stuart); Actæon Islands, 20 fm. (Rodway).

Subfamily 7. DASYPHILEÆ, Schmitz.

Muellerena, Schmitz.

M. insignis (Harv.), De Toni. Ulverstone (Lucas); Low Head (Mrs. Perrin).

Subfamily 8. CROUANIEÆ, Schmitz.

Ballia, Harv.

B. callitricha (Ag.), Mont. *Passim.*
B. robertiana, Harv. Southport (Stuart).
B. scoparia, Harv. Reminé (Rodway); Port Arthur (Lucas).

Antithamnion, Naegeli.

A. plumula (Ellis), Thuret. George Town (Harvey); Derwent (Lucas).
A. nodiferum, J. Ag. Port Arthur (Lucas).
A. dispar (Harv.), J. Ag. East Coast (Gunn).
A. divergens (J. Ag.), De Toni. George Town (Gunn, Harvey).
A. mucronatum (J. Ag.), De Toni. *Passim.*

Crouania, J. Ag.

**C. gracilis*, J. Ag. T. (Gunn).
C. australis (Harv.), J. Ag. Table Cape (sec. Harvey); Low Head (Lucas).

Lasiothalia, Harv.

L. hirsuta, Harv. Ulverstone (Lucas).

Subfamily 9. SPYRIDIEÆ, J. Ag.

Spyridia, Harv.

S. biannulata, J. Ag.
S. breviarticulata, J. Ag.
S. opposita, Harv. T. (Stuart).

Subfamily 10. CERAMIEÆ (Dumort), Schmitz.

Ceramium, Wiggers.

C. ramulosum, H. & H. Tamar (Gunn).
C. puberulum, Sond. Tamar (Lucas).
C. stichidiosum, J. Ag.
C. subcartilagineum, J. Ag. *Passim.*
**C. divergens*, J. Ag. T. (sec. J. Agardh).
C. deslongchampii, Chauv. (sec. Harvey.)
**C. mónacanthum*, J. Ag. Derwent (Rodway).
C. isogonum, Harv. T. (McGowan).
C. nobile, J. Ag. Derwent (Lucas).
C. gracillimum, Griff. and Harv. George Town (Harvey).
C. æquabile, J. Ag. *Passim.*
**C. torulosum*, J. Ag. Maria Island (Rodway).
C. excellens, J. Ag. Derwent (Lucas).
C. clavulatum, Ag. *Passim.*

Subfamily 11. THAMNOCARPEÆ.

Thamnocarpus, Harv.

T. gunnianus, Harv. George Town (Harvey)
**T. harveyanus*, J. Ag.

Order 4. CRYPTONEMINÆ, Schmitz.

Family 1. GRATELOUPIACEÆ, Schmitz.

Halymenia, C. Ag.

**H. chondropsidea*, J. Ag.
**H. speciosa*, Zan. George Town (Mrs. Goodwin).

Grateloupia, C. Ag.

**G. prolifera*, J. Ag. (Mrs. Meredith.)
G. filicina (Wulf.), Ag. *Passim.*
**G. dubia*, Zan. Hobart (sec. Zan.).

Pachymenia, J. Ag.

P. apoda, J. Ag.

Carpopeltis, Schmitz.

C. phyllophora (H. & H.). Schmitz. Port Arthur (Jeannerett).

Thamnoclonium, Kuetz.

T. claviferum, J. Ag. *Passim.*

Family 2. DUMONTIACEÆ (Bory), Schmitz.

Dasyphlœa, Mont.

D. tasmanica, Harv.

Family 3. NEMASTOMACEÆ (J. Ag.), Schmitz.

Nemastoma, J. Ag.

N. feredayæ, Harv. George Town (Mrs. Fereday).
N. palmata, Harv. T. (Miss Browne).

Family 4. SQUAMARIACEÆ (Zan.), J. Ag.

Peyssonnelia, Dcne.

P. gunniana, J. Ag. Tamar (Mrs. Perrin).
P. australis, Sond. *Passim.*

Family 5. CORALLINACEÆ (Gray), Harv.

Lithothamnion, Phil.

L. lichenoides (Ell. & Sol.), Heydrich. *Passim* on *Ballia callitricha.*

Mastophora, Dcne.

M. lamourouxii, Dcne. *Passim.*
M. canaliculata, Harv. (C. Stuart.)

Amphiroa, Lamour.

**A. tasmanica*, Sond. (C. Stuart.)

Metagoniolithon, Weber de Bosse.

M. charoides (Lamour.), Weber de Bosse. North Coast.
M. stelligerum (Lamarck), Weber de Bosse. *Passim.*

Cheilosporum, Aresch.

C. mallardiæ (Harv.), De Toni. *Passim.*

Corallina (Tournefort), Lamour.

Subgenus *Jania*, Lamour.

J. micrarthrodia, Lamour.

Subgenus *Eu-Corallina*, Yondo.

C. officinalis, L. *Passim.*
C. cuvieri, Lamour. *Passim.*

The Corallines of Tasmania have been very imperfectly studied.

THE PARASITISM OF *EXOCARPUS HUMIFUSA*, R. BR.

By

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(Read 14th May, 1928.)

Exocarpus humifusa, R. Br., is a small prostrate shrub found on Tasmanian mountain tops. Three other members of the genus are found in the State, and these extend to the mainland. The most familiar is the native cherry, which is common in the eastern states, but the Western Australian record of which is doubtful. The family *Santalaceæ*, to which *Exocarpus* belongs, is noted for the root parasitic habits of its members. In Europe and Asia the parasitism of *Thesium, Comandra, Osyris* (1), and *Santalum* (2) has been fully investigated, and in Australia the genera which have been proved to enter into this unequal partnership with other plants are *Fusanus, Choretrum, Leptomeria,* and *Exocarpus* (3, 4, 5, 6, 7). In the case of *Fusanus spicatus* (*Santalum cygnorum*), the Western Australian sandalwood, the knowledge of its parasitism is of economic importance, as it is useless to attempt to cultivate this valuable tree in the absence of a host plant.

The parasitism of the native cherry (*Exocarpus cupressiformis*) was proved in 1910 by Dr. Margaret Benson, who obtained her material from Killara, New South Wales. This plant, like other phanærogamic parasites, attaches itself to the host by means of a haustorium, which is composed of two parts—an outer cortical region and an inner conducting region, and by this means obtains water and food material.

The habits of *Exocarpus humifusa* were investigated in January, 1928, at Lake Fenton, National Park. The plant is fairly common on the rocky mountain sides in the higher altitudes where the predominant trees are *Eucalyptus gunnii*, *E. coccifera*, and *E. urnigera*. It grows with *Telopea truncata*, *Orites diversifolia*, *Hakea lissosperma*, *Olearea pinifolia*, various epacrids, and others, and examination showed that it attacked them all indiscriminately. Some plants belonging to the family *Santalaceæ* show a preference in hosts, and *Leptomeria spinosa* in Western Australia was found on *Eremæa pilosa* only. A wide range of hosts such as that possessed by this Tasmanian species is a great advantage, and increases the plant's chances of survival. It must be remembered that the death of the host means the death of its dependant, and that a one host parasite is limited in distribution to the area occupied by the victim species, and also has a restricted food supply in that area.

Exocarpus humifusa possesses a well-developed root system, ramifying through the soil a few inches from the surface and coming into frequent contact with the roots of other plants. Its roots are white, rather fleshy, and devoid of root hairs. These characters are common amongst root parasites. Where they come into contact with other roots—either their own or those of other species—haustoria are formed. These are minute disc-like outgrowths which are visible to the naked eye, and usually one line in diameter when fully developed. Because of their small size they do not penetrate far into large roots, the fusion being between the cortical cells of the host and the parenchymatous cells of the haustorium. The haustoria are consequently easily detached from the host root, and care has to be exercised during the digging operations in order to get them out intact.

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NOTES ON THE GENUS *PORIA*.

By

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and

L. Rodway, C.M.G.

(Read 11th June, 1928.)

THE PORIAS AND PORIA-LIKE FUNGI WITH DEFINITELY COLOURED HYPHÆ.

The genus *Poria* is admittedly one of the most difficult groups amongst the Basidiomycetes to deal with from a systematic point of view. The position is to a great extent chaotic. Many of the descriptions are very meagre, and it is often impossible to refer plants correctly to known species without access to the actual type specimen. Many species seem variable, due often to the differences between a young plant only establishing itself and an old one which has had ample time to develop fully. Through the kindness of the late Dr. C. G. Lloyd, Miss E. M. Wakefield, Dr. James R. Weir, and Dr. G. H. Cunningham, we have had some of our Australian species identified or have received identified foreign species for comparison. The present paper is part of an attempt to hall-mark by specific names some of our Australian species. In spite of its representing years of laborious work, many complete recastings, and the condensation of pages of manuscript, we feel far from satisfied with the result, and present this part as a present "jumping-off ground" which may have to be re-erected later on a modified basis.

From an examination of many specimens of Australian Porias and Poria-like fungi, we think that they are best divided primarily by the colour of the hyphæ as seen under the microscope under two divisions, viz., those with the hyphæ not coloured or only slightly so and into those with the hyphæ quite distinctly coloured. With the latter we deal in this paper, dividing them again into those with hyphæ dull yellowish, with hyphæ yellowish-brown, and with hyphæ livid brown or more or less fuscous or purplish brown. The following key is an attempt to differentiate briefly the Australian species we have examined under these three sub-divisions.

The species dealt with are numbered consecutively to those dealt with by one of us in the last paper of this series. The Roman figures following the names of colours, e.g., Old Gold (XVI.), refer to the plates in Ridgway's *Colour Standards and Colour Nomenclature*, 1912.

In the compilation of this paper, there has been a partial division of labour, one of us (L.R.) being mainly responsible for the Tasmanian specimens, the other for the continental ones.

KEY TO THE AUSTRALIAN PORIAS AND PORIA-LIKE FUNGI WITH DEFINITELY COLOURED HYPHÆ.

I. Hyphæ dull yellowish. General colour of plants, old gold.

A. Setæ present.

Setæ 165 to 190 x 8 to 11.5 μ. Pores minute, 6 to 7 in 1 mm . . . . *Poria setuloso-crocea*

B. Setæ few or absent.

Pores 2 to 2½ in 1 mm. . . . . *Poria crocea*

II. Hyphæ yellowish-brown and hence the substance brown of various shades.

A. Setæ present and readily demonstrable.

Setæ usually under 50 μ. long.

Pores 3 to 4 in 1 mm.

Substance thin, tawny olive, Prout's brown, Brussels brown, tendency to pileation in narrow brackets or in ungulate frustules with pallid pores . . . . *Polyporus subcontigua*

Substance thin, wood brown to buffy brown, setæ acuminate, 45 x 9 μ. . . . . *Poria victoriæ*

Substance thin (in Australian plants), darker, snuff brown to bistre, edge velvety, setæ with broadened bases, 18 to 45 x 5 to 9 μ. *Poria contigua*

Pores 4 to 7 in 1 mm.

Ferruginous, then ferruginous brown, tawny, or cinnamon (Australian plant tawny olive), light (not heavy), pores 5 to 6 in 1 mm., setæ 27 to 50 x 7 μ. . . . . . . *Poria ferruginosa*

Darker, umber brown or dark tawny brown, subiculum almost none, thin or thick, pores 5 to 6 in 1 mm., setæ ventricose, 15 to 30 x 4 to 5.8 μ. .. .. *Poria lævigata*

Dresden brown to darker, cut surface wood-colour, not very dark, edge definite and more gilvous, pores 5 to 6 in 1 mm. .. *Poria sublævigata*

Snuff brown, subiculum more tawny, pore layer distinct, pores 5 to 7 in 1 mm., setæ 19 to 32 x 7 μ., sometimes not found .. .. *Fomes conchatus* (resupinate form)

Brussels brown, substance more gilvous, subiculum considerable, some setæ hooked .. .. *Poria uncinata*

Setæ over 50 μ. long.

Argus brown, context more gilvous, thick, relatively light in weight, pores 2½ in 1 mm., setæ 64 to 72 x 8 μ. .. .. *Poria subweirii*

B. Setæ absent or few and hard to find.

Spores hyaline, some occasionally tinted.

Thin or thick (1 to 7 mm.), Sudan brown becoming Brussels brown, pores 4 to 5 in 1 mm., spores hyaline, sometimes tinted, 6 to 7 x 5 to 5.5 μ., setæ none or rare .. .. *Poria friesiana*

Thin to 6 mm., "ferruginous" (ochraceous tawny to buckthorn brown), pores 5 in 1 mm., setæ not seen .. .. *Poria carteri*

Closely adherent, thin to 4 mm. thick, wood brown to cinnamon brown, darker when old, pore mouths glancing, 6 to 7 in 1 mm., spores 3.5 to 5 μ., setæ none or few, 6 x 3 μ., 26 x 7 μ. .. .. *Poria brunneo-adherens*

Thin, surface light-coloured (between chamois and warm buff) becoming tawny olive, ochraceous tawny on section, pores oblique, lacerated, 3 in 1 mm. .. .. .. *Poria luteo-fulvus*

Spores definitely brown.

Thin, Argus brown, light in weight, pores large, irregular, 2 to 3 in 1 mm., spores tawny brown, 5.5 to 7.5 x 3.7 μ. .. .. .. *Poria tasmanica*

III. Hyphæ livid brown (more or less fuscous).

Extensive, thick (up to 7 mm.), surface dingy pallid, becoming fuscous to drab and blackish-fuscous when old, substance purplish fuscous, spores 5 x 3.5 μ. . . . . *Fomes lividus* (usually resupinate)

(a) HYPHÆ DULL YELLOWISH. GENERAL COLOUR OF PLANTS, OLD GOLD.

483. *Poria setuloso-crocea*, n. sp.—Forming irregular closely adherent patches, up to 7 cm. x 1 cm., in the irregular interstices of bark and the surface of decaying wood, in colour paler than Old Gold (XVI.), near to but paler than Isabella Colour (XXX.). The very thin sterile mycelium before the pores form approximates to the same colour and is granular or villous looking. Thickness up to 1 to 1.5 cm., the tubes browner than the surface colour, context practically absent, resting on the mycelium-penetrated substratum. Pores very minute, a little irregular in size, about 6 to 7 in 1 mm., dissepiments rounded. Spores fairly numerous, elliptical, one end more pointed than the other, 5.5 to 6 x 3.7 μ. Hyphæ slightly but definitely tinted yellowish or brownish yellow. Long narrow acuminate deep brown setæ, 165 to 190 x 8 to 11.5 μ. Causing rotting of the stump of a Pepper-tree (*Schinus mollis*), Fullarton, near Adelaide, July, 1924.

484. *Poria crocea*, Pers. (as *Polyporus*).—Forming patches 4 or more cm. in diameter and up to 5 mm. thick, in colour near Old Gold (XVI.) or lighter or darker, zoned on the under surface, sterile margin free, byssoid, broad and obtuse. The tubes are 2 to 4 mm. long, the subiculum definite but thin. The orifices are irregular, vary in size, about .3 mm. in diameter, usually about 2 to 2½ in 1 mm., sometimes broken into Irpex-like teeth. Hyphæ definitely yellowish, usually about 4 μ. in diameter, a little irregular, setæ not seen. Tasm.—Cascades, Hobart, July. Dr. C. G. Lloyd, in identifying the specimens for us, adds "neither to " the eye nor under the microscope can I tell any difference " between this Tasmanian plant and our *Polyporus croceus*, " but our plant is always pileate, never with any resupinate " portions, as far as my specimens go, yet Mr. Rodway's " plant is all resupinate. If the same species, it is strange " it should take such different habits in the two countries. " . . . If it is our plant, it is a bright orange yellow while fresh " and dries reddish brown. The colour change is very

"marked. The pores of the Tasmanian plant are a cm. "deep. We have a similar species, *Poria mutans*, with the "same colour change in drying, but our *Poria* never has pores "more than a mm. or two deep, and therefore cannot be the "same." The above description we have drawn up from our specimens. It seems probable that it is a species distinct from *Polyporus croceus*, Pers., though we provisionally give this authorship to it as a *Poria*.

485. *Polyporus subcontigua*, n. sp.—Sometimes forming small ungulate Fomes-like brackets, occasionally when the attachment is narrowed almost stalked, 5 mm. in size, with a greyish-brown rather radiately rough convex upper surface and a convex or concave pallid under-surface on which the irregular pores appear (these colours may be due to weathering). These small brackets may be alone present or the plant may be almost entirely resupinate, with here and there small brackets or narrow shelves with the above features. The resupinate portion may extend over several centimetres (e.g., 6 x 2 cm.), is very thin (1-3 mm.), and is near Brussels Brown (III.) to Prout's Brown (XV.) or Tawny Olive (XXIX.) and darker, sometimes with a more gilvous subtomentose edge near Buckthorn Brown (XV.). The pores are irregular, 3 to 4 in 1 mm., often oblique, the dissepiments thin and rather lacerated in the resupinate part, thicker and more rounded in the pileate, the mouths glancing, appearing pallid in certain lights, brown in others. The substance is tough, dark brown in the pileate portion, with no very evident subiculum, the pores being probably stratose and Fomes-like. Spores (?) hyaline, 5 to 7 x 3.5 μ.; hyphæ yellow-brown, thick-walled, 2 to 4 μ.; setæ dark brown, subulate to acuminate with a broad base, 26 to 55 x 4 to 9 μ. at the base. S.A.—Onkaparinga R. near Clarendon on fallen trunk (identified by Dr. C. G. Lloyd, No. 753, as *Poria contigua* "but with pileate formation"); Flinders Range near Quorn, August, 1921 (identified by Lloyd, No. 771, as *P. contigua*); on fence post, Clare, August, 1922; Myponga, May, 1927, on fallen trunks, ungulate forms only 5 mm. in size; Williamstown, June, 1927. W.A.—A non-pileate plant from Pemberton, August, 1926, may be this species.

This plant is related to such species as *Polyporus gilvus* (Schw.), Fr., and *Poria contigua*, Pers., both of which have brown setæ. The size of the pores is near that of *P. contigua* and larger than that of *P. gilvus*. The definite tendency to

pileation and the occurrence of ungulate forms removes it from *Poria*, and it may be considered as a *Polyporus* approaching *Fomes*. The species can be recognised by the size of the pore-mouths (3 to 4 in 1 mm.), the presence of brown setæ, and the tendency to form narrow shelves or small ungulate brackets. The small size of the latter, when occurring without a resupinate extension, renders them difficult to detect, the upper surface resembling the dead wood of the substratum, but the pallid pore-bearing surface, seen in the brackets but not noticeable in the resupinate extension and probably partly due to fading, forms a contrast when the log is turned, which draws attention to the fungus.

486. *Poria victoriæ*, Berk.—Miss Wakefield has kindly identified for us one collection as this species and another as *P. victoriæ prox.* She says:—"The original specimen of this " species in Herb. Berk. (labelled 'Victoria, Dr. Muller, 1855' " but without specific name) is one of the forms with brown " flesh and brown setæ. It was quite misunderstood by " Cooke, and under the name he included a mixture of various " species, mostly old and in poor condition. It is very close " to certain European species such as *P. contigua* or *P.* " *lævigata*, and may possibly prove to be the same as one " of them."

The specimens identified with certainty by Miss Wakefield (No. 16) were growing as small irregular patches 1 to 2 cm. long in the hollows of the rough bark of apparently a box-like Eucalypt near Wangan, Pilliga Scrub, N.S.W., in October, 1918. The colour is near Wood-brown (XL.). The thickness is 1 to 2 mm. The pores are mostly oblique from the upright position, the orifices very minute, about 3 to 4 in 1 mm., a little irregular in size with the thin dissepiments rounded. The hyphæ are yellow-brown, rather thick-walled, 3.5 to 4 μ., slightly wavy. The brown setæ are acuminate with the apices rather blunt, about 45 x 9 μ., not very numerous. Spores were not detected.

The plant identified as *P. victoriæ prox.* by Miss Wakefield forms irregular encrusting patches covering the rugged surfaces of the thickened base of a small dead tree. The fungus has agglutinated a few small leaves and formed pore patches on these. The wood is light from permeation, pallid in the centre, but with a thick brownish layer on the outer aspect. The pore surface is near Buffy Brown (XL.), darker than Snuff Brown (XXIX.), the edge and context gilvous

near Buckthorn Brown (XV.), Pores are about 4 in 1 mm., dissepiments rounded. The hyphæ are yellow-brown, usually about 3.7 μ. (2 to 4 to occasionally 5 μ.), a little irregular in calibre, thick-walled with acute branches. Setæ dark brown, few, acuminate. Spores hyaline, 7 x 3.4 μ. Milson Island, Hawkesbury R., May, 1915.

A *Poria* from Burnberry, N.S.W., September, 1916, is darker, near Snuff Brown (XXIX.), darker from some angles, paler from others, and seems to link on to what we consider to be *P. contigua.* It forms an extensive thin patch, 10 x 3 cm., with the tubes very obliquely placed, pore mouths about 3 in 1 mm., with numerous brown acuminate setæ with swollen bases, 17 to 35 x 6.5 μ.

487. *Poria contigua,* Pers.—The plants we refer to this species form thin patches (in our specimens) up to 12 x 4 cm. but usually less and about 1.5 mm. thick, Snuff Brown to Bistre (XXIX.) in colour and have relatively large pores (about 3 in 1 mm.), hyphæ yellow-brown, 2.5 to 3.7 μ., and thorn-like acuminate brown setæ with broadened bases 18 to 45 x 5 to 9 μ. In growing plants the narrow edge is paler and velvety, and in old plants the colour may be darker than bistre. The two Tasmanian collections were identified as such by C. G. Lloyd. Tas.—Lindisfarne, September, 1920, January, 1921. N.S.W.—Milson Is. S.A.—Locality not stated, 1920. These plants do not quite agree with English (Rea) or French (Bourdot and Galzin) descriptions of this species where the colour appears to be more bright (tawny cinnamon, umber cinnamon), the subiculum thicker (0.5 to 1 mm.), and the plants themselves up to 12 mm. thick. Our species closely resembles a specimen identified by Dr. James R. Weir as *P. ferruginea-fusca,* Karst., on *Pinus contorta,* Idaho. These plants are similarly thin, pore mouths about the same in size, colour nearly the same and border velvety, but in the American plants acuminate setæ are few, about 50 x 4 μ. With Lloyd's determinations and the more abundant setæ, we place our Australian plants at present under *P. contigua.*

To this species we also refer a plant, very like our Milson Island one, from Mr. E. J. Semmens (No. 19) on dead timber, Creswick, V., colour Bistre (XXIX.) from some angles, much darker from others, pores 4 in 1 mm., a few acuminate brown setæ with broadened bases, 45 to 57 x 8 μ. Another plant, from Mt. Lofty (?) was referred to Dr. Weir (No. 184), who reported:—"If the spores I find (hyaline, globose)

" are the true ones, I would refer it to *Poria victoriæ*, Berk. " from Victoria (type), but not material ex Cooke from Clar- " ence River." The specimen does not resemble very closely the plant identified for us as *P. victoriæ* by Miss Wakefield, corresponding better with the specimens we place under *P. contigua*. The colour is Snuff Brown to Bistre (XXIX.), pores 3 to 4 in 1 mm., numerous brown acuminate setæ 31 to 47 x 8 μ. at the bases. In the wood is some gilvous-coloured tomentose mycelium.

488. *Poria ferruginosa*, Schrad. (*Fomes ferruginosus*), is described as being bright rusty, then rusty brown, the subiculum 1 mm., the trama light (not heavy), the tubes cinnamon, 2 to 6 mm. long, the pores rusty-brown 4 to 5 in 1 mm., spores 4.5 to 5 x 2.75 to 3.4, cystidia abundant, deep brown, 30 to 50 (to 150) x 6.8 μ. We refer to this species, a specimen forming a thin crust-like layer, darker than Tawny Olive (XXIX.), on old mycelium, with 5 to 5½ pore mouths in 1 mm. and with a few dark brown acuminate setæ with broadened bases, 27 x 7 μ., Bulli Pass, N.S.W., November, 1919. Another specimen, thick (up to 8 mm.), resembles closely an English specimen of *Fomes ferruginosus*, but is darker (surface a little paler than Raw Umber, III., cut surface near Brussels Brown, III.). It is light in weight, pores 5 to 6 in 1 mm., hyphæ yellow brown, 2.5 μ., setæ narrow, thorn-like with flattened bases, brown, 22.5 to 30 x 6.5 μ. Locality not stated, N.S.W. probably. This plant seems also best referred to *P. ferruginosa*.

489. *Poria lævigata*, Fr.—The following collected by the late Mr. A. Zietz, probably in S. Australia, seems best referred to this species. It resembles closely a specimen identified for Dr. Cunningham of Wellington, N.Z., as *P. punctata*, Fr. Bourdot and Galzin consider *P. punctata* as a synonym of *P. friesiana*, in which setæ are rare. As in Dr. Cunningham's specimen setæ are readily found, perhaps his plant should be considered rather as *P. lævigata*.

Forming a circumscribed raised growth 12 x 5.5 cm., Drabs (XLVI.), Wood Brown (XL.) in certain lights, the rather broad sloping nearly smooth to subtomentose sterile edge between Wood Brown and Buffy Brown (XL.), the context near Brussels Brown (III.). It is intimately attached to the subjacent bark, in the centre being about 5 mm. thick or 7 to 8 mm. if the infiltrated outer bark be included. The pores are oblique, minute, about 5 to 6 in 1 mm., dissepiments

rounded, spores hyaline, oval, 6.5 x 4.8 μ. Hyphæ brown, about 3.5 μ. A few brown acuminate setæ, 19 to 30 x 7.5 μ.

490. *Poria sublævigata*, n. sp.—Forming patches up to 12 x 2 cm., with outlying small pore-bearing islands 2 or 3 mm. in diameter, up to 4 mm. thick in the centre, shelving to the edge which is fairly sharply defined and in the growing part outlined by a narrow paler more gilvous zone near Buckthorn Brown (XV.). Pore surface glancing with the angle of light, paler than Dresden Brown (XV.) to much darker when old. Occasional sterile patches sometimes as a peripheral rim, subtomentose (microscopically finely strigose). Subiculum practically none. Cut surface wood-colour, not so dark as in *P. lævigata*. Orifices about 5 to 6 in 1 mm., dissepiments thin, microscopically strigose. Spores hyaline, subspherical, oblique, with a large gutta, 6.8 x 5.2 μ. Hyphæ yellow brown, 4 μ. Setæ dark brown, varying much, slightly curved or straight, acuminate, with ventricose bases, 19 to 35 x 5 to 7.5 μ. On small branches. N.S.W.—Locality not stated.

A species evidently closely related to *P. lævigata*, which the name suggests.

491. *Fomes conchatus* (Pers.), Fr., may sometimes be found entirely resupinate, forming a thin partly concave shell-like layer, 1 to 2 or more mm. thick, the pore surface Snuff Brown (XXIX.), the tubes forming a distinct layer, the subiculum more tawny (near Antique Brown, III.), as is the underlying penetrating mycelium, pores minute, 5 to 7 in 1 mm., spores hyaline, 5 μ., 4 x 3.4 μ. (Rea gives them as ferruginous, Lloyd as hyaline), setæ dark brown, acuminate, with bases sometimes broadened, 19 to 32 x 7 μ., sometimes not found. N.S.W.—Tuggerah, October, 1914.

492. *Poria uncinata*, Weir, n. sp.—Forming raised masses 9 x 5 cm. or more in size and 1.5 cm. thick, the edges raised and subdeterminate, in colour a little darker than Brussels Brown (III.), on section more gilvous in parts and near Antique Brown (III.), covering the charred surface of an old stump. The fungus is moderately heavy, not extremely light. Sterile portions are subvillose. Tubes mostly short (about 2 mm.) and the subiculum considerable passing into the interpenetrating mycelium. Orifices minute, about 4 to 5 in 1 mm., a little angular, dissepiments rather rounded. Spores hyaline, subspherical, 5.5 x 3.7, 3.5 μ. Hyphæ yellow-brown, thick-walled, calibre a little irregular, usually about

2.5 μ., sometimes 3 μ. Setæ dark brown, thorn-like, with broad, sometimes flattened bases and acute or blunt ends, sometimes definitely hooked, thick-walled, 17 to 30 x 5 to 7.5 μ. at the bases. N.S.W.—Milson Island, Hawkesbury R., March, 1915.

Dr. James R. Weir referred a portion sent to him to *Fomes rubiginosus*, Berk., adding a note as follows:—"*F.* "*rubiginosus*, Berk., not Wallr., and *F. robinsoniæ*, Murr., "belong to a group which are characterised by hooked setæ. "In this group are found specimens that are usually referred "to *F. korthalsii*, Lev., *F. senex*, Nees et Mont., and *F. tor-* "*ulosus*, Pers. If the above is a constant character and the "specimens cannot all be referred to *F. rubiginosus*, Berk., "they should be separated under some such name as *F.* "*uncinatus*." We believe our plant is not *F. rubiginosus*, which moreover has not yet been found within some hundreds of miles from this locality, and so accept the name Dr. Weir has suggested as applied to a *Poria*.

493. *Poria subweirii*, n. sp.—Forming extensive patches, 10 cm. or more in extent, up to 20 mm. thick in the centre, thinning to 1 or 2 mm. at the edge, subdeterminate, the tubes, usually forming most of the thickness, near Argus Brown (III.), the context gilvous near Buckthorn Brown (XV.). Orifices of the tubes about 2½ in 1 mm., irregular, the thin dissepiments often defective so that one orifice is continuous with a neighbour. In the substratum and also in the tubes, whitish hyphal strands (perhaps adventitious) are interspersed in the gilvous matrix. Setæ brown, long, pointed, 64 to 72 x 8 μ. at the base. Spores not seen. S.A.—On dead *Casuarina stricta*, Ait., Mt. Dutton, E.P., May, 1923. Identified by the late Dr. C. G. Lloyd as "*Poria* near *P.* "*weirii* but unnamed." The plants are relatively light, but not so much so as the American *P. weirii*.

494. *Poria friesiana*, Bres., is described by Bourdot and Galzin (Bull. Trim. de la Soc. Mycolog. de France, 1925, XLI., p. 243) as widely extended, 5 to 20 cm., in a plaque or pad, 0.5 to 2.5 cm., the subiculum thin or almost none, bright cinnamon to umber cinnamon, the border almost none or pubescent fawny cinnamon, the tubes stratified up to 7 mm. long, the pores fine, 4 to 5 in 1 mm., rusty cinnamon, umber or tobacco-coloured with a greyish pruinosity, hazel, mycelium pale fawn or sulphur, spinules usually absent, spores hyaline, then pale cream, subglobular, 6.5 to 8 x 5 to 6.8 μ. The spores when long in the tubes may become brownish.

We refer the following Tasmanian specimens, of which we have some half-dozen collections, to this species. The plants are variable, sometimes thin, sometimes thick (even in the same collection), and without obvious setæ. The spores were easily found in the Tasmanian plants and some were always tinted. A variable species forming usually thin patches, 1 to 3 mm. thick and up to 12 x 2.5 cm. in size, sometimes thicker plaques up to 7 mm. thick with the tubes stratose, the border often fairly defined and slightly raised, sometimes with outlying islands, the sterile edge almost absent or narrow and pubescent, the pores often oblique, when horizontal minute, 4½ to 5 in 1 mm., in colour near Sudan Brown (III.) or more gilvous, the older pores becoming darker near Brussels Brown (III.), sometimes very dark, the hyphæ yellow brown, sometimes varicose, 2 to 4.2 µ. thick, spores subspherical or subspherical triangular with a small gutta, 6 to 7 x 5 to 5.5 µ., 5.5 to 6.5 µ., usually hyaline but often slightly, sometimes decidedly, brown, two doubtful setæ seen. Tasm. (L.R.)—Cascades, June, July, August, 1919. We also refer here a specimen from Staughton Vale, Brisbane Ra., V., November, 1923. We place provisionally under *P. friesiana* a brighter coloured plant from Macquarie Pass, N.S.W., August, 1917—near Sayal Brown (XXIX.), darker and more ferruginous in certain lights, one short-brown seta seen, 19 x 7.6 µ., occasional subspherical hyaline or yellow-brown spores 4 5 to 5 µ.

495. *Poria carteri*, Berk. (Grev., 1886, XV., p. 25), is described as "ferruginous, effused, very thin, light, with the " margin scarcely strigose, the tubes short, pores punctiform, " round, equal, very minute, the dissepiments thick. Bombay. " The pores much smaller than any other of the ferruginous " species." Dr. Weir has identified for us a specimen as this species. It forms a thickish hard adherent patch, about 6 x 5 cm. and 6 mm. thick in the centre, Ochraceous Tawny to Buckthorn Brown (XV.), the tubes oblique, the pores very fine about 5 in 1 mm., the subiculum less than half the thickness, hyphæ yellow-brown, usually about 3 µ., setæ not seen. N.S.W.—Katoomba, December, 1916.

Forming large thick patches, 10 cm. or more long and up to 1.5 cm. thick, Fomes-like, consisting mostly of the pores, the context relatively narrow, the tubes near Argus Brown (III.) not so yellow as in Weir's specimen, the orifices Warm Sepia to Bistre (XXIX.) and darker, also not so yellow as in Weir's plant. The tubes are 7 to 13 mm. deep, the

orifices nearly sealed up and very minute, about 6 in 1 mm., regular, the dissepiments rather rounded. The plant shelves towards the determinate edge with a broad sterile almost crusted surface of the same colour as the pore orifices and up to 2 cm. wide. Hyphæ yellow-brown, thick-walled, 2 5 to 3 μ. in diameter. Setæ not seen. Spores white, subspherical, 5 to 6 μ. Bunya Mts., Q., October, 1919.

For lack of means of adequate differentiation, we refer also to this species a specimen from Katoomba, N.S.W., December, 1916. This is also a thick brown *Poria*, apparently without setæ. It is not so heavy as the Bunya Mts. specimen, is Ochraceous Tawny to Buckthorn Brown (XV.), is up to .8 mm. thick, the tubes forming about half of the thickness, the orifices are also very minute, about 5 in 1 mm., and the yellow-brown hyphæ are usually about 3 μ. thick.

496. *Poria brunneo-adherens*, n. sp.—Forming extensive (10 to 20 cm.) brown determinate patches intimately adherent to the underlying wood and very difficult to detach, thin at the periphery but in old plants up to 4 mm. thick in the centre. The colour varies as viewed from different angles and reflected by the glancing mouths of the tubes from near Wood Brown (XL.) or lighter than Cinnamon Brown (XV.) to darker than Prout's Brown (XV.), when old becoming a very dark brown, on section near Cinnamon Brown. Pores exceedingly minute, about 6 to 7 in 1 mm., often oblique, shallow near the edge, the dissepiments thin and not setulose. Subiculum very thin, most of the substance being composed of the old filled tubes. Hyphæ yellowish-brown, 2 5 to 4 μ. Occasional short, acuminate, dark brown setæ found (6 x 3, 11 x 4, 30 x 7 μ., etc.). Spores hyaline, subspherical, 5 x 3.7 μ. Forming extensive patches on the undersides of old logs. S.A.—Inman Valley, January; National Park, July, August (spores 3.5 to 5 μ.).

The chief characteristics of the species consist in the extensive intimately adherent dull brown patches becoming very dark when old, in the minute size of the pores and their glancing mouths and the difficulty in finding the short dark brown setæ. The specific name refers to the colour and to the intimate adherence of the plant to the underlying matrix.

Poria luteo-fulvus, n. sp.—Forming patches up to 12 x 2 cm., up to 2 mm. thick, the surface between Chamois (XXX.) and Warm Buff (XV.), becoming Tawny Olive, on section

Ochraceous Tawny (XV.), the pores very oblique, lacerated, about 3 in 1 mm. The substance turns brown when bruised. Hyphæ yellow brown, thick-walled, rather irregular in calibre, 4 to 6.5 μ. Part of our collection was submitted to Dr. James R. Weir, who reported:—"Poria sp. probably not named, " spores elongate ellipsoid hyaline, setæ large strikingly *un-* " *cinate*, may be seen with a hand lens; in group with *Poria* " *cryptacantha*, Mont. (*P. cerea*, Berk.)." We have not been able to detect these setæ, which must be few in number.

Poria tasmanica, n. sp.—Forming a thin patch, about 3 x 2 cm. in size, up to 5 mm. thick in the centre, the edges somewhat raised in places and velutinate, very light in weight and soft to the touch, near Argus Brown (III.), the tubes about 2.5 mm. deep, the subiculum about the same, the pores large and varying in size, 2 to sometimes 3 in 1 mm., the dissepiments thin and fibrillose, hyphæ brown and up to 5.5 μ. thick, spores tawny brown, oblique, flatter on one side, 5.5 to 7.5 x 3.7 μ., setæ not seen. Tasm.—On fragments of (apparently) charcoal, Lindisfarne, January, 1921.

Fomes lividus, Kalchb.—Forming extensive patches up to 20 x 9 cm., with the edge usually sharply defined. Pores minute, about .16 mm. wide, about 6 in 1 mm., pore layer 3 to 7 mm. deep. Hymenial surface when young near Putty Colour (Dauthenay, Pl. 311) or greyer, or darker and greyer than Flesh Colour (Dauth., Pl. 67); when older, becoming near Fuscous (Ridgway, XLVII.), passing into Drab (XLVI.) and thence to the paler edge; when very old, sometimes blackish fuscous on which fresh patches of the greyish putty-coloured younger growth may appear. Tubes near Drab or darker or more fuscous than Natal Brown (XL.), sometimes showing grey tints. Context purplish fuscous, very thin, 1 to 1.5 mm., firm-floccose like compressed cotton-wool, sometimes appearing beyond the hymenial area as a dark livid brown scorched-looking sloping edge. Hyphæ microscopically of a rather livid fuscous brown, a little irregular, 2 to 5.5, usually about 3.5 μ., thick. Spores white, subspherical to irregularly oval or rather quadrilateral, 5 x 3.5 μ. Q.—Imbil State Forest, near Gympie, August, identified by Miss Wakefield, No. 14; on dead *Acacia*, Bribie Island, Moreton Bay, September. N.S.W.—Milson Island, Hawkesbury R., on fallen logs and dead branches, January, February, March (Miss Wakefield, No. 29), November; Kew, March, October; Terrigal, June; Lismore, August (Miss Wakefield, No. 30); Taree, January.

R. M. JOHNSTON'S MEMORANDA RELATING TO THE FISHES OF TASMANIA.

By
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Plates II.-IV.

(Communicated by L. F. Giblin.)

(Read 13th August, 1928.)

Thanks to the kindly interest of Professor T. T. Flynn, I have been allowed to examine and report upon an interesting note-book inscribed "Memoranda relating to the Fishes "of Tasmania examined by Robt. M. Johnston." This is an old exercise book, belonging to the library of the University of Tasmania, which contains the original notes from which Robert Mackenzie Johnston wrote his invaluable paper, (2) "General and Critical Observations on the Fishes of Tas- "mania; with a Classified Catalogue of all the known "Species," and is especially important because some sketches therein illustrate the types of Johnston's new species which have not been figured in scientific publications. Most of the notes and drawings were made in the early 'eighties, but one entry, dated 14th March, 1918, concerning the Nannygai *(Trachichthodes affinis)*, shows that Johnston was keenly interested in fishes up to the year of his death.

Johnston's notes are mostly still legible and many are transcribed in this paper. Descriptions which have already been published are not however repeated, though quotations are made from some of the newspaper cuttings which had been pasted in the note-book. Such additions and annotations as have been thought advisable are enclosed in square brackets to distinguish them from Johnston's actual notes. I have brought the nomenclature of the species up to date, whilst including the original identifications. References to literature have been added and the notes arranged in an order more in conformity with modern classifications.

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(1) By permission of the Trustees of the Australian Museum.

(2) Pap. Proc. Roy. Soc. Tasm. 1882 (1883), pp. 53-144; the description of *Coryphaenoides tasmaniae* on p. 143 did not appear in reprints.

Isurus glaucus (Müller & Henle).

Oxyrhina glauca, Müller & Henle, Syst. beschr. Plagiost. 1839, p. 69, pl. xxix. Java.

Isurus glaucus, Waite, Rec. S. Austr. Mus. ii., 1921, p. 21, fig. 27.

[A good pencil sketch of a Blue Pointer Shark is unfortunately without data. This species was first recorded from Tasmania by Cross (3) as *Oxyrhina gomphodon*.]

Clupea bassensis, McCulloch.

Clupea sprattus, Günther, Proc. Zool. Soc. Lond. 1871, p. 672. Not *C. sprattus*, Linn.

Clupea (Pomolobus) bassensis, McCulloch, Zool. Res. Endeavour i., 1911, p. 16, pl. iv., fig. 2. Bass Strait & Tasmania.

Clupea sprattus. D. 15-18. A. 18-20. There are about 11 scutes behind base of ventral fin. Opercular striæ almost obsolete. Pectorals reaching half distance from base to root of V. Head contained in length of body 3 2-3 times, and depth 4 2-3 times. Eye 1-3 length of head. No spots along median band visible. Silvery iridescent. Belly silvery with violet shade; dorsal darker, of a steel-gray colour. Total length 67, body 56, eye 5, depth 12, com. of dorsal 29½, vent. 41. One specimen caught, 6¼ inches long, and 1 1-8 deep; sp. of that size preserved. Tamar River, caught at Bar, Launceston, in shrimp-net, March 16, 1880.

Salmo eriox, Linnæus.

Salmo eriox, Linnæus, Syst. Nat., ed. 10, 1758, p. 308; ed. 12, 1766, p. 509. *Ex* Artedi. Rivers of Sweden.

Salmo trutta, Jordan, Copeia 155, 1926, p. 140.

Salmo fario. A specimen caught in Latrobe Creek, Tasmania, 27 Jan. 1880. 22½ lbs. in weight, 2'9" long, girth 2 feet. Pale pinkish fully developed ova.

Retropinna tasmanica, McCulloch.

Retropinna tasmanica, McCulloch, Rec. Austr. Mus. xiii., 1920, p. 54, pl. xi., fig. 4. Huon River, Tasmania.

Retropinna richardsoni. B. 9. P. 11. D. 12-13. A. 17-19. C. art. long rays 19. Greatest length 3 7-8. Head 5-8. Greatest depth 7-8. Caught in abundance in shrimp-nets in the Tamar, near Launceston, Dec., Jany., Feb.

(3) Cross, Proc. Roy. Soc. V. Diem. Land iii., 1, 1855, p. 81.

Galaxias weedoni, Johnston.

(Pl. II., Fig. 1.)

Galaxias weedoni, Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 131. Mersey R., Tas.

Galaxias atkinsoni, Johnston, *ibid.*, p. 131. Pieman River, Tasmania.

Galaxias weedoni, Regan, Proc. Zool. Soc. Lond. 1905 (1906), p. 377, pl. xi., fig. 1.

Galaxias weedoni. D. 11. A. 14. P. 15. Length of head 22; Body 97; Depth, max. 20, least (tail) 8½. Snout 7. Eye 4. Distance from snout to commencement of Pectoral, 25½; Ventral 51; Dorsal 73; Anal 75.

G. atkinsoni. Pieman River, Tasmania, 28th Nov. '79 T. R. Atkinson.

[Note added later:—] Mr. Irving in early May 1894 sent me from Great Lake one of several specimens almost identical with the above, as regards dusky bar markings, but close to the characters of *G. attenuatus* in other respects.

Galaxias truttaceus (Cuvier).

Esox truttaceus, Cuvier, Règne Anim., ed. 1, 1816, p. 184, footnote. No loc.

Galaxias truttaceus, Regan, Proc. Zool. Soc. Lond. 1905 (1906), p. 378, pl. xiii., fig. 4. *Id.* Johnston, Proc. Roy. Soc. Tasm. 1908 (1909), p. iv. (double-mouthed).

G. truttaceus. D. 11, last nearly double. A. 13. [P.] 15. V. 7. Head broad, depressed. Mr. Seal tells me that this variety is always found high up the mountain slope in broken water, generally seen under stones or lying upon them, not swimming about in still pools as is the habit of the spotted trout found lower down. He is of opinion that the head also is more depressed, while the colour markings are very distinct. The position and rays of fins do not however seem to differ and, if like the Mountain Lake Trout *(G. auratus)*, may be hardly [more than] a racial variety.

G. truttaceus var.? or a distinct species. [This specimen is referable to the *"Forma typica"* of Regan, *loc. cit.* p. 379.] D. 11. A. 14. P. 15-16. V. 7. B. 9. C. long rays 17. Length of head 27, body 118. Depth, max. 26, min. at tail 11. Eye 4½. Snout 6. Distance from snout to commencement of dorsal 80, pectoral 28½, ventral 65½, anal 84. George's Bay.

Galaxias auratus, Johnston.

Galaxias auratus, Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), pp. 62 & 131. Great Lake, Tasmania. *Id.* Regan, Proc. Zool. Soc. Lond. 1905 (1906), p. 379, pl. xiii., fig. 1.

B. 9. P. 14. D. 11. A. 14. This fish attains a size of about 10 inches. It is of a bright golden hue and almost transparent. The spots too become fewer, rounder, and very light. Mountain Trout, Lake Sorell. Total length 9½, body 8 3-8, head 2½, snout ¾, eye 3-8. Greatest breadth behind orbit nearly 1¼. Maxillary extending to a vertical below posterior of eye. Longest pectoral ray 1 1-8. Longest dorsal ray, the first, 1 1-8; least and last ½. Longest anal ray 1 3-16; least and last ½, nearly.

Prototroctes maræna, Günther.

Prototroctes maræna, Günther, Cat. Fish. Brit. Mus. v., 1864, p. 382. Southern Australia. *Id.* Saville-Kent, Proc. Roy. Soc. Tasm. 1885 (1886), p. cv. (eggs & development). *Id.* Waite, Rec. Austr. Mus. iv., 1902, p. 265, pl. xli.

B. 6. D. 11. A. 20. P. 14. C. 18 long art. rays. Scales become larger and more regular as they approach the tail; about 17 transverse rows of scales from termination of dorsal to commencement of adipose fin. There appear to be only 6 articulated rays in the ventral fin in Tas. species.

School reported from Kingston by Mr. Swan (about 300), 20 Nov. 1882. One sent has the following characters: D. 11. A. 19. P. 14. *V. 6 branched rays!* as noted above.

Tinca tinca (Linnæus).

Cyprinus tinca, Linnæus, Syst. Nat., ed. 10, 1758, p. 321; ed. 12, 1766, p. 526. *Ex* Artedi, Europe.

"*La Tanche vulgaire,*" Cuvier, Règne Anim., ed. 1, ii., 1816, p. 193. Vernacular only.

Tinca vulgaris. B. 3. D. 11. P. 16. A. 9. V. 11. Head 2¾ inches. Length of body, 11 5-8. Total length 13.6 inches. Greatest depth 4 inches; greatest girth 9; depth at narrowest part of tail 1 7-8, girth at do. 4.

Pectorals reaching nearly to origin of ventrals. Ventrals extending to posterior margin of vent. Anal reaching to commencement of caudal rays. Dorsal rays 2½ inches in depth. Commencement of dorsal distant 6 inches from snout.

Contents of stomach—remains of *Bettupnella legrandiana* and *Lymnæa huonensis.*

Specimen 2/2/80 from Longford [sent] by Mr. Wilson, who informs me that they are very abundant there in backwater reaches of the South Esk. I am also informed that the Brown Trout frequently attacks them. The fins are sometimes nearly destroyed by their voracity. I have frequently seen the fins of the Blackfish, *Gadopsis marmorutus,* destroyed in this manner.

[Transportation of Tench from Tasmania to Sydney is mentioned in Proc. Roy. Soc. Tasm., August, 1863, p. 3.]

Seriolella dobula (Günther).

Neptomenus dobula, Günther, Proc. Zool. Soc. Lond. 1869, p. 429. Tasmania.

Neptonemus dobula. The Mackerel Snotgall or Mackerel Trevally. Large shoals at Dunkley's Point, July 5th, 1884. Four dozen caught, made up of the two species which seem to run together in schools. They are also reported to be abundant on the same day at Kangaroo Pt. where they were found the year previously in numbers.

A great shoal now in the bay, caught 2 or 3 dozen on Garth's Bank; fine size. 14 & 19 May 1883. D.7/1/37-39; A. 2/1/23.

Ten dozen of these fish caught by one man during one evening on Queen's Birthday, 1883. There were thirty boats fishing at Kangaroo Bay, besides large numbers fishing from the wharves. All catching fish in abundance. They move about in schools, bite freely, and when hooked fight spiritedly in a zig-zag movement.

Derwent 28 March 1882. They are tender in the mouth. Large individuals must then be played easily. They were not accompanied by the snotgall [*S. brama,* Günther] as upon the former occasion.

[On another page] D.7/1/37; A.2/1/23. Tip of pectoral not reaching to anus, shorter than head, somewhat rounded. Body elongate, tapering to tail. Eye deep. Total length 8 3-8; Body 7; Head 2; Snout $\frac{1}{3}$; Eye $\frac{1}{2}$; length of Pectoral $1\frac{3}{4}$; height of Body 1 7-8. Caudal deeply cleft.

Paramacrurus australis (Richardson).

Lepidoleprus australis, Richardson, Proc. Zool. Soc. Lond. 1839, p. 100. Port Arthur, Tasmania.

Cœlorhynchus mortoni, Ogilby, Proc. Roy. Soc. Tas. 1896 (1897), p. 83. Derwent Estuary, Tasmania.

Cœlorhynchus, Paramacrurus, australis, McCulloch, Biol. Res. Endeavour v., 1926, p. 177.

Macrurus australis. D. 13/88; A. 87; V. 7; L. Lat. 130; L. tr. 4/15; Vert. 14/53.

Trachichthodes affinis (Günther).

Beryx affinis, Günther, Cat. Fish. Brit. Mus. i., 1859, p. 13. Australia.

Austroberyx affinis, McCulloch, Zool. Res. Endeavour i., 1911, p. 43, fig. 11.

Beryx affinis. A fine specimen of *Beryx affinis* (Nannegai). D. 7/12; A. 4/13; V. 1/7; L. tr. 6/12; L. Lat. 43. Caught in Derwent 10 April, 1895. Examined by me and found to be in all characters identical with those caught more abundantly near Sydney.

[Note added much later, in shaky handwriting:—] 4 specimens in Fish Shop, Elizabeth [Street, Hobart]. Caught in Derwent Estuary, 14th March, 1918. One of the specimens about 15 inches long. Evidently this is about the season when the "Nannegai" *Beryx affinis* enters the estuary of the Derwent. R.M.J.

Lampris regius (Bonnaterre).

(Pl. II., Fig. 2.)

Pleuronectes regius, Bonnaterre, Tabl. Encycl. Meth., Ichth., 1788, p. 79. "L'Ocean" (Duhamel).

Zeus guttatus, Brunnich, Nye Saml. K. Danske Skrift. iii., 1788, p. 403 (*fide* Sherborn, Ind. Anim.).

Zeus luna, Gmelin, Syst. Nat. (Linnæus), ed. 13, 1789, p. 1225. "In mari Normanniam" (Duhamel).

Lampris luna, Morton, Proc. Roy. Soc. Tasm. 1896 (1897), p 99. *Id.* Lord & Scott, Vert. Anim. Tasm. 1924, p. 39.

[A photograph by J. W. Beattie of a specimen found washed ashore at Port Arthur is inserted in Johnston's notebook, and is reproduced here.]

Lophotes guntheri, Johnston.

Lophotes guntheri, Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), pp. xlv., 142, & 177. North-west coast of Tasmania.

[Details printed in a newspaper cutting gummed in the note-book are:—]

"A singular fish, closely allied to, but distinct from, the "ribbon fish family, has been received by Mr. John Swan, "and presented by him to the Fisheries Exhibition Commis- "sion. The fish was captured in the neighbourhood of Emu "Bay, north-west coast. We are indebted to Mr. R. M. "Johnston for following description:—Although measuring "3 feet 8 inches in total length, and 7¾ inches in greatest "depth, the fish is very thin, not exceeding 1 5-8 inches at any "part along the sides of the body. Its snout projects beyond "the mouth—upwards and outwards, like the stem of a "ship. A fin of 257 pinkish rays extends continuously along "the dorsal, from snout to caudal fin, which latter is very "much attentuated. The sides are uniformly silvery. The "eyes are extremely large—black centre and yellow mar- "gin. The anal fin is very much reduced, and placed far back "near the caudal. Ventral fin thoracic, elementary. The fol- "lowing are the symbols of the general character:—B. 6. "D. 221/36. A. 16-14th. P. 14. V. 1/5. L. Lat. 208. L. tr. "25/40; teeth feeble on maxillaries and mandibles; two "series; a few on vomer and palatines. It is closely allied "to *Lophotes cepedianus*, the only other species known, and "only hitherto reported as captured in the Mediterranean "and Japanese seas."

Nannoperca tasmaniæ (Johnston).

(Pl. III., Fig. 3.)

? *Nannoperca australis*, Günther, Proc. Zool. Soc. Lond. 1861, p. 116, pl. xix., fig. 2. Murray River.

Microperca tasmaniæ, Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 110. Esk River.

Nannoperca tasmaniæ, McCulloch & Waite, Rec. S. Austr. Mus. i., 1918, p. 45.

Microperca tasmaniæ. B. 5. D. 8/1/7-8; A. 3/8; V. 1/5; L. trans. 3/9; long. 28-30.

Total 3 3-16. Head 13½ sixteenths. Eye 3-16. Height 3-8. Snout 2½ sixteenths. Body oblong, compressed. Pierced scales in two somewhat irregular series, the first 9 in number from shoulder to below sixth spine of first dorsal, the second consisting of 4 indefinite distant scales along middle of body to tail, commencing from about middle of soft dorsal. Lower margin of operculæ simple. Dark olive, with a distinct pinkish longitudinal streak along middle from shoulder to tail. Base of dorsal, anal, and caudal pinkish, with blackish margins. Belly silvery, tinged with gold. Eye dark blue with gold streak around eye-ball. Scales ctenoid. North and South Esk, Tasmania; descends sometimes to brackish waters near Launceston.

D. 7/1/9; A. 3/7; V. 1/5; L. tr. 3/9; long. 28. D. 8/1/8; A. 3/7; V. 1/5. Body compressed. Preoperculum not serrated. Scales relatively large, ctenoid. Dorsal deeply cleft; anterior part composed of eight spines, 2 & 3 being longest. The posterior [dorsal] consists of 1 spine and 7 soft rays, scarcely as high as the anterior spinous portion. Ventrals thoracic, consisting of 1 spine and 5 soft rays. Anal situated immediately under soft dorsal, consisting of 3 spines and 8 soft rays; the second spine of anal is the longest, and the first is short and stout. Pectorals of thirteen rays.

The pierced scales of the lateral line are in two somewhat irregular series; the first 9 in number from the shoulder to a line drawn through 6 spine of dorsal; the second series consisting of about 4 indefinite distant pierced scales, lower and running along the middle of the body and caudal peduncle.

The young of these are frequently found dead, when the brackish water lagoons of the North and South Esk are beginning to dry up in summer.

Trachinops caudimaculatus, McCoy.

Trachinops caudimaculatus, McCoy, Prodr. Zool. Vict. ii., dec. 20, 1890, p. 341, pl. cxciv. Hobson's Bay, Victoria.

Pseudochromis rodwayi, Johnston, Roy. Soc. Tasm. Abstract 29 April, 1902 (published May, 1902), p. 6. George's Bay, Tasmania.

Trachinops tæniatus & caudimaculatus, Hall, Roy. Soc. Tasm. Abstr. 10 April, 1911 (May, 1912), p. xi.; Proc. Roy. Soc. Tasm. 1911 (1912), p. 32; *ibid.* 1912 (1913), p. 83.

[The type of *Pseudochromis rodwayi*, Johnston, is preserved in the Tasmanian Museum. A newspaper cutting gives the following information:—]

"New Tasmanian Fish. Mr. R. M. Johnston read the "following notes on a new Tasmanian fish:—Mr. Rodway, "who takes a keen interest in all branches of the natural "history of Tasmania, besides that of his loved science of "botany, of which he is now our chief local authority, has "recently submitted for my examination a small fish, "preserved in spirits. Unfortunately, there was only one "specimen obtained, and it is so shrivelled up that some of "the ray characters cannot be very exactly determined. "This specially applies to the anterior portion of the dorsal "rays, which for nearly half the length of this fin are rudi-"mentary or undeveloped, and closely enveloped in a some-"what thick and (now) opaque skin. However, the prin-"cipal dental, scale, and other characters leave no doubt in "my mind as to its true generic position, viz., the genus "*Pseudochromis* of the family *Trachinidæ*. The following "contains a fuller description:—Family *Trachinidæ*. Genus "*Pseudochromis*, Rupp. Head and body rather compressed, "more or less elongate; cleft of the mouth slightly oblique, "with the lower jaw longest; eye lateral. Scales of moderate "size, ciliated; lateral line interrupted. One dorsal with a "few spines anteriorly; ventrals thoracic; the lower pectoral "rays branched. Jaws with cardiform teeth, anterior with "canines; vomer and palatine bones toothed. Præoperculum "entire. Six branchiostegals; the gill-membranes joined "inferiorly; pseudo-branchiæ and air-bladder present; "pyloric appendages, none. Indian Seas, Port Darwin, "George's Bay, Tasmania. *Pseudochromis rodwayi*, R. M. "Johnston. D. 3/26-27. A. 3/17. P. 17. L. lat. 50? L. tr. "11. The height of the body is nearly five times in the total "length; the length of the head four and a half. In front "of both jaws there are markedly curved canine teeth, the "three in the lower jaw the stronger; there are, besides nar-"row bands of small canine teeth on jaws, vomer and palatine "bones; no spines on the operculum. Dorsal and anal "produced posteriorly; half of the anterior portion of the "former undeveloped or rudimentary, and enveloped for the "most part in a somewhat thick, (now) opaque, skinny in-"tegument. The number of spines on dorsal probably three, "but not determined satisfactorily. Diameter of the eye "nearly equal to width of interorbital space, and greater than

"the length of the snout. Colour in spirits a uniform darkish "brown. This interesting little fish is only about 3¾ in. in "length, and is somewhat of the general appearance of one "of our common shore blennies. Mr. Rodway informs me "that the fish was captured by Mr. Hinsby, an enthusiastic "collector, in or near George's Bay. It is to be hoped that he "may soon obtain a few more specimens, in order to settle "a few doubtful points in some of the characters. It is "remarkable that, with the exception of a single member of "the genus *(P. muelleri)*, described by Klunzinger from "Port Darwin, this is the first member of the genus caught "in Australian waters. The specific name is given by me in "honour of our own distinguished botanist, Mr. L. Rodway."

[Johnston has added a few MS. notes.] Read before the Royal Society of Tasmania at the opening meeting of the session on 30th April, 1902.

D. 3/27? A. 3/17? P. 17. Scales moderately large, finely ciliate. Total length 29. Head 6¾. Eye 1¾. Caught about first week in April, 1902, or latter part of March, 1902.

Apogon lemprieri, Johnston.

(Pl. III., Fig. 4.)

Apogon lemprieri, Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 142. Dunkley's Point, Tasmania.

[Johnston's drawing of the type, a specimen, four inches long, from Sandy Bay, Dunkley's Point, is here reproduced.]

Arripis trutta (Bloch & Schneider).

Sciæna trutta, Bloch & Schneider, Syst. Ichth. 1801, p. 532. *Ex* Forster MS. Queen Charlotte Sound, New Zealand.

Centropristis salar, Richardson, Proc. Zool. Soc. Lond. 1839, p. 95. Port Arthur. *Id.* Zool. Voy. Erebus & Terror, Fish. 1845, p. 29, pl. xx., figs. 4-6.

Arripis truttaceus, Johnston, Proc. Roy. Soc. Tas. 1882 (1883), p. 110.

Arripis salar. D. 9/18. P. 16-17. V. 1/5. A. 3/11. Length of body 6 3-8. Head 1 5-8. Total 7½. Greatest depth 1 5-8; least at tail 3½ eighths. Greatest girth 4.

Handsome compressed body and head. Silvery sides and belly, leaden blue on back, dull brownish or golden spots above lateral line. Pectorals yellow. Caudal dullish yellow. Membrane of other fins pale white, the rays somewhat yellow-

ish. Five rows of apparently pierced scales above the regularly well-defined lateral line, and fifteen rows of [similar ones below it.] The latter have a bright sheen of silver.

Perca fluviatilis, Linnæus.

Perca fluviatilis, Linnæus, Syst. Nat., ed. 10, 1758, p. 289; ed. 12, 1766, p. 481. *Ex* Artedi. Europe.

River Perch, introduced from England. D. 15/2/14. V. 1/5. A. 2/8. P. 13. Length of body 10½ inches. Head 4¼. Total length 11½. Greatest depth 4. Depth at narrowest part of tail 1 inch nearly. Greatest girth 8 inches. Ventral, caudal, and anal fins, in contrast to prevailing dark brown of body and other fins, are decidedly pinkish in colour.

Specimen obtained from Campbell Town where they were introduced from Hobart some years ago. Donor, Mr. Hardwicke Weedon. Localities where they are known to have been introduced: Reservoir, Hobart Town; Lake Dulverton; Campbell Town; Early Rises, Corra Lynn, near Launceston. Specimen very fat and full of immature ova. Contents of stomach in an advanced stage of decomposition—pulpy fatty matter—unknown.

Cheilodactylus spectabilis, Hutton.

Chilodactylus spectabilis, Hutton, Fish. N. Zeal., Cat. diagn., 1872, p. 8. Cook Straits, New Zealand.

Sea Carp. B. 5. D. 17/27. P. 14, 6 simple. A. 3/9. V. 1/5. C. 17. L. lat. 58. L. tr. 5/13-15. Hobart, 21/3/81.

Six simple pectoral rays, the second uppermost of which is the longest and nearly reaches to vent. Dorsal fin notched; 4th, 5th, and 6th spines (nearly equal) longest, not so high as soft dorsal. The second anal spine very strong, not so long as the third. Length equal to 3 3-5 that of the head or 2¾ that of the height of the body. Eye reddish. Diameter of eye scarcely one-sixth of the length of the head. Soft spine of operculum greatly produced, enveloped in a fleshy marginal skin. Back and sides dark reddish brown with six or seven transverse *lighter broad equidistant* bands directed slightly backwards; eight black bands including shoulder and caudal shades. Spinous dorsal, base of pectoral, ventral, and anal, reddish; lower parts of belly, hollow space behind gill-openings and protractile mouth mottled with brilliant red. Total length 19 inches. Body 16. Head 4 3-8. Longest pectoral ray 4; longest soft dorsal 1¾; longest soft anal 2½.

decreasing toward tail. Snout 1 5-8. Snout to junct. P.O. 3 inches. P.O. posterior margin vertical and forming a right angle to body. Eye $\frac{3}{4}$. Girth, max. 14, and min. 4. Greatest depth 7, least 1 5-8. Dorsal situated in a groove, shielded by about two rows of smaller scales.

Dactylopagrus macropterus (Bloch & Schneider).

(Pl. IV., Fig. 5.)

Cichla macropterus, Bloch & Schneider, Syst. Ichth. 1801, p. 342. *Ex Sciæna macroptera*, Forster MS. New Zealand.

Sciæna macroptera, Forster, Descr. Anim. mar. Australis (ed. Lichtenstein) 1844, p. 136. South Island of New Zealand.

Dactylosparus macropterus, McCulloch, Zool. Res. Endeavour i., 1911, p. 66, pl. xii.

A double-mouthed Sea Perch *(Chilodactylus macropterus)*. [Fishes with two mouths are rarely encountered. Johnston (4) recorded a specimen of *Galaxias truttaceus* with this abnormality, but the existence of a second Tasmanian case of this sort is of considerable interest.]

The singular specimen figured was captured in the estuary of the Derwent on the sixth Feby. 1885. The ordinary mouth was perfectly sealed, and a new deformed mouth had been developed under the lower jaw at the base of the triangular area between the lower mandibles near the junction with the gill-openings. The abnormal mouth was not armed with bony jaws or teeth, but the tongue was perfectly developed and protruded slightly. The tongue and mouth were of an inky black colour like the interior part of mouth and throat of the ordinary species. It is difficult to say whether the normal mouth was permanently sealed or otherwise, but it is quite possible that the aperture was accidentally formed under the jaw and under such cir[cumstances that] the necessity of existence rendered it necessary to close the normal mouth, and [led to] the formation of a new one at the accidentally formed aperture. The abnormally formed mouth seemed to answer its purpose satisfactorily, for the animal otherwise appeared perfectly formed, and was in a healthy condition.

(4) Johnston, Proc. Roy. Soc. Tasm. 1908 (1909), p. iv.

Dactylopagrus morwong (Ramsay & Ogilby).

Chilodactylus carponemus, Richardson, Proc. Zool. Soc. 1850, p. 61. *Id.* Johnston, Proc. Roy. Soc. Tasm. 1883 (1884), p. lviii. *Id.* Ogilby, Ed. Fish. N.S. Wales 1893, p. 55, pl. xviii.; and of most authors dealing with eastern Australian specimens. Not *C. carponemus*, Cuvier, Règn. Anim., ed. 2, ii., 1829, p. 177 (=*Cichla macropterus*, Bl. Schn.).

Chilodactylus polyacanthus, Ramsay & Ogilby, Abstr. Proc. Linn. Soc. N.S. Wales 25 Aug. 1886, p. iv., & Proc. Linn. Soc. N.S.W. (2) i., 1886, p. 880. *Nom. nud.*

Chilodactylus morwong, Ramsay & Ogilby, Proc. Linn. Soc. N.S. Wales (2) i., 1886, pp. 879 & 881. Botany Bay.

Chilodactylus carponemus, Parkinson. The Old Man Perch. Oct. 3rd, 1883. [A species which] on examination proved to be *Chilodactylus carponemus* referred to by Dr. Richardson in his first contribution to our knowledge of Tasmanian fishes, but which was subsequently supposed to be an error, as a specimen had not been recorded as captured in Tasmanian waters since that time. Moreover, the original specimen described had lost its colour in spirits, and it is inferred that the references to colour taken from the descriptions of other writers were not altogether to be relied upon, as there seems to be no satisfactory proof that colours noted by local observers referred to the specimen described by Dr. Richardson.

The species hereafter described is therefore unusually interesting, as the colour was noted when the fish was in life and the other characters carefully examined and noted immediately after being taken from the well of the fisherman's boat.

The following is the description:—

B. 6 (7). D. 17/1/32; A. 3/18; L. lat. 64. [L. tr.] 7/16-8/17. Length of head is one-fourth of the total length. Seven rays of the pectoral simple, the longest of which—the second—reached to about a vertical drawn through the eighth ray of anal fin in mature specimens and about one-third of the total length. Dorsal fin notched; the fifth, sixth, and seventh spines of anterior are the longest. The posterior soft dorsal with a sheath covered with three rows of scales. Scales on the sides silvery, with pinkish margins. Upper part of snout, occiput, shoulder, and a patch at root of pec-

toral fin above long ray, deep violet blue, with undulating furcate streaks of gold, radiating irregularly outwards from the upper posterior and anterior margins of the eye. Soft rays of anal and dorsal ornamented with fainter alternating longitudinal streaks of pink and gold. The caudal, ventral, and spinous fins yellowish with tinge of pink.

	8 Oct. 1883.	20 Sept. 1888.
Greatest length	29 inches	36 inches
Length of body	25½ inches	35 inches
Length of head	7¼ inches	9½ inches
Length of snout	4 inches	—
Diameter of eye	1⅕ inches	1¼ inches
Greatest depth	8¼ inches	12 inches
Least depth	1¾ inches	3 inches
Longest pectoral ray ..	9½ inches	10 inches
Snout to root of pectoral	7¾ inches	—
Snout to vent.	14½ inches	—
Girth	—	26 inches

Two of *C. carponemus* caught 14 miles off Tasman Island on what is described as a beach coral bottom (26 fathoms). [23 Oct., 1883.]

20 Sept., 1888. To-day examined a fine specimen of *C. carponemus* of much larger dimensions than the two captured near the same spot on October 23rd, 1883, a description of which is given above. B. 6. D. 17/31-32 (31Y); A. 3/17-18 (17Y); P. 15; L. lat. 64; L. tr. 7/18. The description is similar to the above.

Latridopsis ciliaris (Bloch & Schneider).

Anthias ciliaris, Bloch & Schneider, Syst. Ichth. 1801, p. 310. *Ex Sciæna ciliaris*, Forster MS. New Zealand.

Sciæna ciliaris, Forster, Descr. Anim. mar. Australis (ed. Lichtenstein), 1844, p. 137. South Island of New Zealand.

Latris ciliaris, Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 113; *ibid.*, 1884 (1885), p. 254.

Latris ciliaris. B. 6. D. 17/19; A. 3/32; L. lat. 84; P. 9/8. Length of head nearly a fifth of total length of body. Total length 23. Head nearly 5 inches.

Caught at George's Bay, Tasmania, where it is stated to be a stranger, and is known as Blue Bastard Trumpeter. Caught 18/8/1884. This is the first specimen seen by me.

Formerly I inferred, not having seen any representative, that the reference to Tasmania was erroneous, and that it had been mistaken for the mature form of the abundant *L. forsteri.*

Latridopsis forsteri (Castelnau).

Latris forsteri, Castelnau, Proc. Zool. Acclim. Soc. Vict. i., 1872, p. 77. Gippsland Coast, Victoria. *Id.* Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 72 (detailed account).

Latridopsis forsteri, McCulloch, Biol. Res. Endeavour iii., 1915, p. 146, pl. xxvii.

The Bastard Trumpeter; Red Bastard. 31 March, 1882. *Latris forsteri?* B. 6. D. 16/1/42; A. 3/34; P. 10/8. I have to-day examined the Red and Silver Bastard. There is now little doubt in my mind that the Red is the immature form of the White Bastard. The opinion among fishermen that the Bastard red or white are all barren fish is erroneous. I invariably found well-developed genital organs in the silver or mature form which is in a very fat and well condition. The white generally is more rounded; the bony obsolete ridges seen in the red form cease to be seen in the more mature and well conditioned white form. The latter has a large mass of pure white fat enveloping the genital organs, and their concealment, or part concealment, may have led to the commonly received opinion that they are sterile, and so explain the origin of the name "Bastard" as a term.

Mendosoma allporti, Johnston.

Mendosoma allporti, Johnston, Proc. Roy. Soc. Tasm. 1880 (1881), pp. 11 & 54. Derwent estuary.

The second specimen seen by me differs from the type by 1 spine less, thus proving the force of my comment as regards variability of species within certain limits. D. 23/26; A. 3/19; Lat. 73. Mouth very protractile. Sent by Mr. B. Webb. P. 17. L. tr. 5-6/15-14. The Real Bastard Trumpeter.

Neoodax balteatus (Cuv. & Val.).

Odax balteatus, Cuvier & Valenciennes, Hist. Nat. Poiss. xiv. 1839, p. 303. No locality (Péron); probably Tasmania.

Two fish caught in fresh water in the Jordan by Mr. Lovett. The Kelp Fish. The Ground Mullet. Total 6 3-8; depth 1¼. D. 17/12; A. 14 or 15; B. 4; P. 13-14; V. 1/5; Lat.

39. L. tr. 5/11. Body elliptical, compressed. Scales minutely dented. Dorsal composed of 29 feeble rays; the first 17 of which are flexible, unarticulated and unbranched; the latter articulate and bifurcate. The 29th ray is cleft to the base. Anal composed of about 15 rays, all feeble and similar to the soft dorsal. The first two rays are simple, unarticulated and feeble. Pectoral 13-14 soft; anterior bifurcated ray. Opercle with a soft laminate spine at upper posterior angle, below which there is a small integumentary expanse with a truncate posterior margin which is distinctly dentate. Teeth in single series in upper and lower jaws. P.O. with a [finely] dentate posterior margin which is vertical. Bones of jaws with median sutures. Teeth apparently continuous into the bone and becoming distinctly longer as they approach the suture. Head pointed, depressed, contained 4 times in the total length. Depth of body 4 1-3 times, Pyloric ap[pendages] 2.

Siphonognathus beddomei (Johnston).

(Pl. IV., Fig. 6.)

?? *Siphonognathus argyrophanes*, Richardson, Proc. Zool. Soc. Lond. 1857 (1858), p. 238, pl. vi. King George's Sound, West Australia.

Odax beddomei, Johnston, Proc. Roy. Soc. Tasm. 1884 (1885), p. 231. Derwent River.

Neoodax beddomei, Lord & Scott, Vert. Anim. Tasm. 1924, p. 76.

[After examining the sketch and manuscripts of Johnston, the late A. R. McCulloch recognised the resemblance of *Odax beddomei* to *Siphonognathus*, and wrote to Mr. Clive Lord about the type. Mr. Lord replied, *in lit.*, 21/5/24, "The " type of *Odax beddomei* is not preserved in our collections, " nor can I find any further trace of same in Johnston's " manuscript. In revising our specimens here recently and " adding to the collections, I failed to secure any species " which would conform with Johnston's description."

Johnston's sketch is here reproduced; his notes have already been printed.]

Gadopsis marmoratus, Richardson.

? *Gadopsis breviceps*, Agassiz. Rept. 14th meet. Brit. Assn. Adv. Sci. 1844 (1845), p. 308. *Nom. nud.*

Gadopsis marmoratus, Richardson, Zool. Voy. Erebus & Terror, Fish. 1848, p. 122, pl. lix., figs. 6-11. Rivers of southern Australia. *Id.* Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 124. *Id.* Noetling, *ibid.* 1910 (1911), p. 253 & footnote. *Ex* Johnston, MS. *Id.* Ogilby, Mem. Qld. Mus. ii., 1913, p. 69, pl. xx.

	D.	A.	P.	Total length.	Head.	Head in length.
(1)	13/26	3/19	17	7 5-8	1¾	4.3
(2)	12/26	3/18	17	6 1-8	1½	4.0
(3)	12/26	3/18	17	5 1-4	1 3-16	4.4
(4)	12/28	3/18	17	10 3-4	2½	4.7
(5)	12/26	3/18	17	8	1 5-8	4.9
(6)	13/26	3/18	17	8 1-4	1 7-8	4.3
(7)	11/27	3/17	17	5 3-8	1 3-16	4.5

D. 10-13/26-28; A. 3/17-19; B. 6. V. 1. Dorsal invariably 13/26 in Corra Lynn specimens.

Pseudaphritis urvillii (Cuv. & Val.).

Aphritis urvillii, Cuvier & Valenciennes, Hist. Nat. Poiss. viii., 1831, p. 484, pl. ccxliii. No locality (D'Urville); probably Tasmania.

Pseudaphritis urvillii, Waite, Rec. Austr. Mus. ii., 1924, p. 482, pl. xxx., fig. 1.

D. 7/0/20; A. 2/22; P. 17; D. 8/19; A. 24; P. 17. From River Jordan.

Gasterochisma melampus, Richardson.

Gasterochisma melampus, Richardson, Ann. Mag. Nat. Hist. xv., 1845, p. 346. Port Nicholson, New Zealand. *Id.* Johnston. Proc. Roy. Soc. Tasm. 1882 (1883), pp. xxxi. & 118. *Id.* Waite, Trans. N.Z. Inst. xlv., 1913, p. 220, pl. viii.

The Butterfly Fish of New Zealand, *Gasterochisma melampus*. B. 5. D. 17/1/10/vi.; A. 2/10/vi.; P. 21; V. 1/5; L. lat. 64; L. tr. 25-27. Caught 22nd May, 1882, by Captain Langworthy of the schooner *Malcolm* while fishing

for 'coota at the mouth of the Derwent. Total length 39 inches, or, without caudal, 33. Snout 4; Pectoral 5¼; Ventral 5¾. Vomerine and palatine teeth.

[Johnston's notes, which also include a number of measurements now difficult to decipher, are accompanied by a newspaper cutting which states:—] "Captain Langworthy, " of the schooner *Malcolm*, presented a very strange fish to " the Royal Society's Museum on Monday. It measured 40 in. " long; has something of the appearance of the tunny, and " belongs to the mackerel family group *Nomeina*. The fish " has only been seen heretofore on rare occasions off the coast " of New Zealand. This seems to be the first caught in Tas- " manian waters, and for the benefit of ichthyologists, it may " be as well to give its general description:—Total length " 40¼ inches; length of body 35in.; length of head 8¾in.; snout " 4in.; depth of body at shoulder 9in., at tail 1in. Tail " widely forked, 12 inches across from tips. Anterior dor- " sal composed of 17 somewhat feeble spines, the posterior " dorsal of one spinous ray, 10 soft branched rays, and six " detached finlets. The anal fin is composed of two spinous, " 10 soft rays, and six detached finlets. Ventral fins one-five, " blackish, 5¾in. long, can be received in a groove; pectoral " fin 21 rays, longest 5¼ in.; branchiostegals 7. It is known " as the 'butterfly fish,' because of the great development of " the ventral fins, especially in young individuals."

Lepidopus caudatus (Euphrasen).

Trichiurus caudatus, Euphrasen, K. Vet. Acad. Nya. Handl. ix., 1788, p. 52 (*fide* Sherborn, Ind. Anim.).

[A sketch by Johnston is accompanied by the following dimensions:—Operculum 9 inches; depth behind head 5; at middle 6, and fourteen inches from tail, 4 inches; caudal peduncle 3-8 in. and caudal fin 3¼ in. long between parallels, in a specimen whose total length was 5 feet 6 inches.]

Gobius tamarensis, Johnston.

Gobius tamarensis, Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 120. *Id.* McCulloch & Ogilby, Rec. Austr. Mus. xii., 1919, p. 229. Tamar River, Tasmania.

[Johnston's notes are practically the same as the text of the published description, except for the measurements given below.]

Head 10½ sixteenths of an inch; eye 1-8; snout 3-16. Greatest breadth between orbits and first dorsal 7-16. Snout to first spine of anterior dorsal 13-16, to first ray of posterior dorsal 1¼, to first spine of anal 1 3-8. Total length 2 11-16.

Gobius tasmanicus, nov. sp.

Gobius tasmanicus, Johnston, MS.

B. 5. D. 6/1/8; A. 1/8. The height of the body is fully one-seventh of the total length. The length of the head is fully one-fourth. The head is depressed, much broader than high. Snout obtuse, convex. Eyes close together, their diameter one-fourth of the length of the head. Cleft of mouth oblique. All the teeth are small. Lower jaw scarcely exceeds upper. Head naked. The second dorsal equals the body in height, and is higher than the first. Pectoral yellowish, reaching to vertical from third ray of second dorsal. Dull brown above, greyish under belly. Dorsal and caudal fins irregularly marked with bars and spots of pinkish brown. Anal and ventral fins dullish white, extremities blackish. Total length about three inches.

Total 69; body 56; head 16; snout 4; Eye 3½; depth 10; length of first dorsal 6; second dorsal 10.

Tamar, Launceston. Brackish water. Jan., Feb., & Mar., 1880. Common.

[Genus *Nesogobius, nov.*

Orthotype.—*(Gobius) hinsbyi*, McCulloch & Ogilby.

The genotype differs from all the other Australian gobies in having seven or eight dorsal spines instead of six.]

Nesogobius hinsbyi (McCulloch & Ogilby).

Gobius pictus, Castelnau, Proc. Zool. Acclim. Soc. Vict. i., 1872, p. 124. St. Kilda, Victoria. Preoccupied by *G. pictus*, Malm., 1865.

Gobius hinsbyi, Johnston, Abstr. Proc. Roy. Soc. Tasm., 13 May, 1902 (1903), p.x. *Nom. nud.*

(Gobius) hinsbyi, McCulloch & Ogilby, Rec. Austr. Mus. xii., 1919, p. 215, pl. xxxiii., fig. 1. *Ex* Johnston MS. Wedge Bay, Tasmania.

D. 9 or 10?/1/10; A. 1/10; P. 19; L. lat. 40? L. tr. 11. Head 4½ [in] length. Greatest depth 5½ [in] length. Light brown, dotted and streaked with red. 11-12 dark brownish crossbands from head to tail. A few streaks of red near bases of both dorsals and caudal. May 5, 1902.

[Newspaper Cutting:—] "Mr. R. M. Johnston tabled a " scientific description of a new species of goby which he " named in honour of Mr. George Hinsby, who has contri- " buted many natural history novelties to the Museum, *Gobius* " *hinsbyi*."

[Johnston's chirotype, in the Tasmanian Museum, was examined by the late A. R. McCulloch who noted its characters as follows:—D. viii./? A. 11. P. 18, upper rays not silk-like. V. i/5; C.?; L. lat.? Depth 12¼ mm. Head 17¼ mm. Eye 4¾ mm. Ventrals 11½ mm. Depth of caudal peduncle 4¾ mm. Body compressed, covered with moderately large scales which extend forward to the interorbital space, and on the operculum; cheeks apparently naked. Interorbital space very narrow. Eyes large and close together. Scales of the upper half with brown marginal spots which tend to form bands. The body is crossed by numerous narrow brown bars. A darker one is placed just behind the preoperculum, and there are some blotches on the preorbital. Caudal with a dark basal blotch. Ventrals and pectorals large, the latter pointed.]

Scorpæna crgastulorum, Richardson.

Scorpæna ergastulorum, Richardson, Ann. Mag. Nat. Hist. ix., 1842, p. 217. Port Arthur.

Scorpæna cruenta, Richardson, *ibid.* p. 217. *Ex* Solander MS. Cape Kidnappers, N.Z. *Id.* Meredith, Tasm. Friends & Foes 1880, p. 248, pl. viii. *Id.* McCulloch, Rec. Austr. Mus. xv., 1926, p. 36.

Scorpæna cruenta, Soland.?? Total length 4¾; body 3¾; head 1 1-3; depth 1 5-16; snout ¾; eye ¾. Colour reddish brown marbled and speckled with darker. Belly, ventral, anal, caudal, and pectoral fins tinged to a bright red. Pectoral reaching nearly to first spine of anal. Second spine of anal longest.

D. 11/1/10; A. 3/1/5; P. 16; L. lat. 25; L. tr. 9/18. Space between orbits ¼ [in.]; second spine of anal ¾; longest soft dorsal [ray] 11-16; fourth to six dorsal 9-16; first dorsal ¼; soft rays of anal ¾; last spine of anterior dorsal 5-16; first spine of anal 5-16.

The *Scorpæna* thus described is the common one about Sandy Bay. Either Solander's species is wrongly described as regards lateral scales or this is a new species.

[This species was first decribed from a drawing made by a Port Arthur convict for Dr. Lhotsky, a remarkable scientist whose exploits have formed the subject of an article by

Iredale (5) entitled "Lhotsky's Lament." The name *Scorpæna cruenta* was appended to the description of the conspecific *S. ergastulorum* by Richardson with a few lines of descriptive matter, but the latter name has precedence through line-priority; it is derived from the Latin, *ergastulum*, "a house of correction for slaves."]

Gnathanacanthus goetzeei, Bleeker.

Gnathanacanthus goetzeei, Bleeker, Verh. K. Akad. Wet. Amst. ii., 1855, p. 21, pl. —, fig. 1. Spelt *Gnathacanthus goetzei* on "verklaring der afbeeldingen" opposite plate. Tasmania.

Holoxenus cutaneus, Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 114. Tasmania.

Holoxenus guntheri, Johnston, *ibid.*, p. 115. Tasmania.

Gnathanacanthus goetzei, Ogilby, *ibid.*, 1896 (1897), p. 82 (synonymy).

Gnathanacanthus goetzeei, Waite, Rec. S. Austr. Mus. ii., 1924, p. 484, pl. xxxi.

The Velvet Fish. Possibly *Holoxenus cutaneus*, Günther, although [it has] D. 8/5/10; A. 3/9; P. 11, simple; sometimes 12; C. 6.6 or 7.6 simple; V. 1/5. Total length 10 [inches]; body $7\frac{3}{4}$; head $3\frac{1}{4}$; snout 1 1-8; eye scarcely $\frac{1}{4}$. Uniform purple red. Uniform red.

[The nctes are scattered around a rough pencil sketch. The fin-formulæ show that they relate to the species named *H. guntheri* by Johnston.]

Patæcus maculatus, Günther, var. *armatus*, Johnston.

Patæcus maculatus, Günther, Cat. Fish. Brit. Mus. iii., 1861, p. 292. Fremantle, W.A.

Patæcus armatus, Johnston, Proc. Roy. Soc. Tasm. 1890 (1891), p. 33. *Lapsus calami*. Tasmania.

Patæcus maculatus, Waite, Rec. Austr. Mus. vi., 1905, p. 75, pl. xv.

D. 32; A. 12; P. 8; B. 6. Teeth on jaws and vomer. Body mottled and speckled with reddish and dark or greyish brown rounded spots which vary in size. Fine interspaces crowded with minute dots of the same colour on a lighter or whitish ground. Warts, distribution and size of larger spots on body and fins as in example described p. 292 of Günther's Catalogue referred to above species.

(5) Iredale, Austr. Zoologist, iii., 1924, pp. 223-226.

Although the typical example from Fremantle, Western Australia, has an olive colour with black spots and the following ray characters:—D. 31; A. 12; P. 8, every other character corresponds, and I am therefore of opinion that the example here described is only a local variety which probably varies slightly in colour and in the number of dorsal and anal rays. Greatest length 5, length of head 1½; length of pectoral 1¼; greatest depth 1½. Caught off Tamar Heads and forwarded to me by Mr. R. Irving, July, 1888.

Blennius tasmanianus, Richardson.

Blennius tasmanius, Richardson, Proc. Zool. Soc. Lond. 1839, p. 99. *Nom. nud.*

Blennius tasmanianus, Richardson, Trans. Zool. Soc. Lond. iii., 1849, p. 129. Tasmania. *Id.* Waite, Rec. Austr. Mus. vi., 1906, p. 205, pl. xxxvi., fig. 5. *Id.* Hall, Proc. Roy. Soc. Tasm. 1912 (1913), p. 79 (variation).

D. 12/18; A. 2 soft head/19; P. 14; B. 6. Description in Günther, p. 214, good.[6] Abundant, Government House jetty, 11/1/1881.

Gillias clarkei (Morton).

Tripterygium clarkei, Morton, Proc. Roy. Soc. Tasm. 1887 (1888), pp. xlvii. & 78. Clarke I., Bass Strait. *Id.* Hall, *ibid.*, 1912 (1913), p. 82.

Blenny. *Tripterygium sp.* B. 4. D. 21/8; A. 2/19; P. 13; V. 2. Length scarcely 3 3-5 times length of head, which is nearly equal to height of body. Eye large. Snout 1½ times diameter of eye, surmounted by a long tentacle which has three or four branchlets. A bifurcate tentacle at nostril. Interorbital space less than diameter of eye and 1-3 length of head. Dorsal in three divisions. Black spot in interspace between first two spinous rays. Lateral line conspicuous al[ong] curvature of [back], descends at point below termination of first dorsal and follows the line along middle of body with more distant pores. Nasal tentacle bifurcate. Body reddish brown, mottled with darker; lighter below. Leven.

Clinus perspicillatus, Cuv. & Val.

Clinus perspicillatus, Cuvier & Valenciennes, Hist. Nat. Poiss. xi., 1836, p. 372. Westernport, Victoria. *Id.* McCulloch, Rec. Austr. Mus. vii., 1908, p. 43, pl. xi., fig. 4. *Id.* Hall, Proc. Roy. Soc. Tasm. 1912 (1913), p. 81.

(6) Gunther, Cat. Fish. Brit. Mus. iii., 1861, p. 214.

Clinus despicillatus, Richardson, Proc. Zool. Soc. Lond. 1839, p. 99. Port Arthur. *Id.* Barnard, Proc. Roy. Soc. V. Diem. Land i., 1851, p. 170. *Id.* Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), pp. xliii & 170.

Clinus despicillatus, Rich. B. 4; P. 14; D. 3/33, 4 soft; A. 2/25; V. 2 bifid. Length equal to four times that of head which is nearly equal to height of body. Coast at the Leven or Fisk, also Port Arthur.

[Another specimen] B. 6. D. 3/33/5; A. 1/26; V. 2.

Rhombosolea monopus, Günther.

Rhombosolea monopus, Günther, Cat. Fish. Brit. Mus. iv., 1862, p. 459. New Zealand.

B. 5. D. 60; V. 6; A. 43. Total length 10¼; body 8½; head 2 11-16; depth nearly 5 inches. [Johnston's notes and sketches evidently refer to *R. monopus*, a species not definitely known from Australia; unfortunately he did not state the locality of this specimen, so doubt must still be expressed as to whether *R. monopus* occurs in Tasmania.]

Rhombosolea tapirina, Günther.

Rhombosolea tapirina, Günther, Cat. Fish. Brit. Mus. iv., 1862, p. 459. Norfolk Bay specimens. *Id.* Norman, Biol. Res. Endeavour v., 1926, p. 284.

? *Rhombosolea leporina*, Günther, Cat. Fish. Brit. Mus. iv., 1862, p. 460. "Australia."

Rhombosolea flesoides, Günther, Ann. Mag. Nat. Hist. (3) xi., 1863, p. 117. Victoria.

Rhombosolea leporina? perhaps *tapirina;* a species of Brill. 5 Jan., 1882. B. 6-7; D. 64; A. 46. Head 1 13-16 (29); body 6 1-8 (98); height 3 3-16 (51); eye nearly 7; caudal 1¼; caudal peduncle (end of dorsal to commencement of caudal) 3-8. Uniform brownish, not marbled or spotted.

This fish seems to bridge the difference between *R. leporina* and *tapirina*. May the former not be a young var. of the latter?

[*R. leporina*, Günther, was regarded as a distinct species by Norman, 1926, who had access to Günther's types when preparing his report on the Flatfishes collected by the *Endeavour*.]

Brachionichthys hirsutus (Lacépède).

Lophius hirsutus, Lacépède, Ann. Mus. d'Hist. Nat. iv., 1804, pp. 202 & 210, pl. lv., fig. 3. New Holland (Baudin); probably Tasmania.

"Fish caught at Port Arthur," Bock, Ross's Hobart Town Almanack, 1835, frontisp.

Brachionichthys hirsutus, Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 121.

17 May, 1882. I also examined a small specimen of *Brachionichthys hirsutus* just brought to the Museum. It has fine spots and short linear streaks of dark brownish red all over the body and fins; deeper blotches towards anterior and posterior extremities of dorsal. Characters:—D. 1/2/18; A. 9; P. 7; V. 1/4. The first spine of second dorsal, and first of pectoral and ventral with fine hooked spines. The body also is covered with minute spines. The colour and rays appear to vary to a great extent in different individuals, and I am now inclined to believe that *B. hirsutus* and *B. lævis* are not specifically distinct.

Brachionichthys politus (Richardson).

Cheironectes politus, Richardson, Trans. Zool. Soc. Lond. iii., 1849, p. 133. Port Arthur. *Id.* Meredith, Tasm. Friends & Foes 1880, p. 249, pl. vii.

Brachionichthys politus, Bleeker, Verh. K. Akad. Wet. Amst. ii., 1855, p. 12. *Id.* Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 121.

[A painting of the Red Hand Fish made by Lady Lefroy and presented to R. M. Johnston is coloured a uniform light red, overlaid with spaced irregularly shaped brown blotches which are largest as they approach the back.]

Cantherhines spilomelanurus (Quoy & Gaimard).

Balistes spilomelanurus, Quoy & Gaimard. Voy. Uranie & Physicienne, Zool. 1824, p. 217. Port Jackson.

Aleuterius paragaudatus, Richardson, Zool. Voy. Erebus & Terror, Fish, 1846, p. 66, pl. xxxix., figs. 1-4. Port Arthur, Tasmania, & Port Jackson, N.S. Wales.

Monocanthus spilomelanurus, Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 135.

[A sketch accompanies the notes:—"Sandy Bay, 7th April, 1882. D. 33; A. 29," and indicates a black transverse bar on the caudal, bluish spots on the sides, a yellow or gold bar on the chin, and "blackish band with blue mark" on the face.]

EXPLANATION OF PLATES.

Plate II.

Figure

1. *Galaxias weedoni*, Johnston. Type. R. M. Johnston *del.*

2. *Lampris regius* (Bonnaterre). A specimen from Port Arthur, Tasmania. J. W. Beattie *photo.*

Plate III.

3. *Nannoperca tasmaniæ* (Johnston). Type of *Microperca tasmaniæ*, Johnston. R. M. Johnston *del.*

4. *Apogon lemprieri*, Johnston. Type. R. M. Johnston *del.*

Plate IV.

5. *Dactylopagrus macropterus* (Bloch and Schneider). A Tasmanian specimen with two mouths. R. M. Johnston *del.*

6. *Siphonognathus beddomei* (Johnston). Type of *Odax beddomei*, Johnston. R. M. Johnston *del.*

Fig. 1. *Galaxias weedoni.*

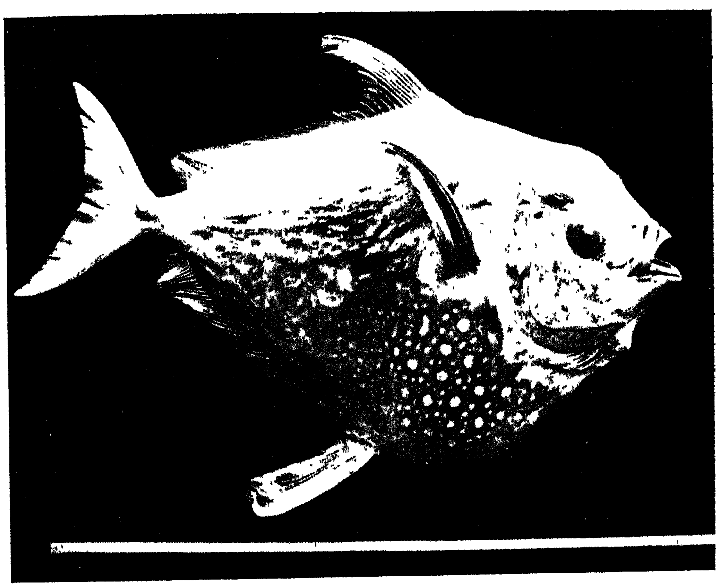

Fig. 2. *Lampris regius.*

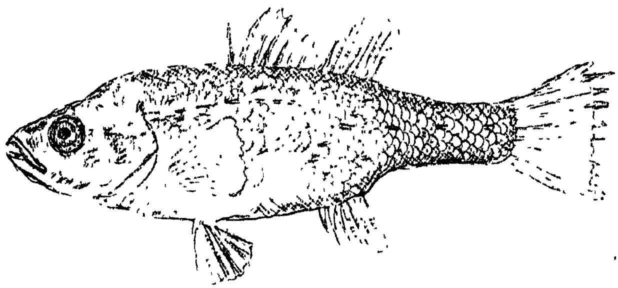

Fig. 3. *Nannoperca tasmaniae.*

Fig. 4. *Apogon lemprieri.*

Fig. 5. *Dactylopagrus macropterus.*

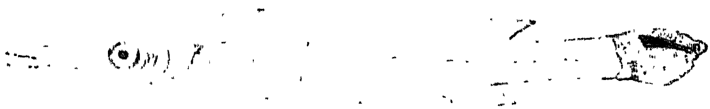

Fig. 6. *Siphonognathus beddomei.*

TASMANIAN GRAPTOLITE RECORD.

By

R. A. KEBLE,

Palæontologist to the National Museum, Melbourne, and to the Geological Survey of Victoria.

(Read 8th October, 1928.)

(Communicated by P. B. Nye.)

In 1902 the late Dr. T. S. Hall commented on the graptolite records of Tasmania (1). After weighing the evidence regarding their reliability, he expressed a conviction that *Diplograptus* sp. had been found at a locality given by the finder, Mr. Thureau, as approximately 10 miles from Strahan, on the old Mt. Lyell Road close to an old road maker's camp and stable near a spring of water.

Incidentally he stated (2) that he had examined the collection belonging to Mr. Thomas Stephens and found traces of graptolites on a piece of hard, jointed, blue black slate with a silky sheen. The specimen was handed to Mr. Stephens by Mr. G. A. Waller, then Assistant Government Geologist, who found it on the Ring River, on the North-East Dundas railway. About the same time Mr. Waller forwarded to Dr. Hall two slabs of slate from a locality on the same railway line 12.35 miles from Zeehan and apparently from the same bed. On one of these Dr. Hall definitely recognised graptolites (3).

Mr. P. B. Nye, Government Geologist of the Tasmanian Geological Survey, has kindly submitted for re-examination two of the slabs examined by Dr. Hall, sent to him by Mr. Waller and now in the possession of the Survey, and Mr. Clive Lord, Director of the Tasmanian Museum, Hobart, has been good enough to add a third, i.e., that formerly in Mr. Stephens's collection. Realising what a keen and accurate observer Dr. Hall was, it would seem scarcely necessary to re-examine the material were it not that since his death a

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(1) Hall, T. S. Evidence of Graptolites in Tasmania, Papers and Proc. Roy. Soc. Tasmania, 1902, pp. 16, 17.
(2) *Ibid.*
(3) *Ibid.*

wealth of new information has come to hand regarding forms and faunas unknown to him and the existence of which was then quite unsuspected.

In regard to the slab from the Stephens Collection (Tasmanian Museum, No. 10935) collected by Mr. Waller from the Ring River, the graptolites preserved as "talcose" markings "can only be seen when the specimen is held in a particular "position with regard to the light" (4). In regard to the thecæ my observations agree with Dr. Hall's that "their outer "edge is straight and the apertural margin is about normal "to the branch" (5), but with these thecal characters and the outline of the polypary, such as it is, I would rather be inclined to refer it to *Retiograptus* than the *Dendroidea* (6). The ferruginous marks seem to me to support the same conclusion.

In regard to the graptolites from the N.E. Dundas Railway, 12.35 miles from Zeehan. The following forms suggest themselves:—

No. 1 slab—

Dichograptid fragt. .. .. Specimen No. 1

No. 2 slab—

? *Tetragraptus* sp. .. .. .. Specimen No. 1

? *Leptograptus* sp. .. .. .. Specimen No. 3

? *Syndyograptus* sp. (distal fragt.) .. ..
.. .. Specimen No. 4

Uniserial stipe (non *Monograptus*) .. ..
.. .. Specimen No. 2

In this poorly preserved collection not even a generic determination is certain.

The evidence as it appears to me is, then:—

1. Dr. Hall was convinced that *Diplograptus* sp. was obtained by Mr. Thureau from Strahan.

2. The indistinct forms from the Ring River suggest *Retiograptus* affinity.

3. The *Tetragraptus* 12.35 miles from Zeehan is reminiscent of *T. tabidus* recently described (7) by me from Nelson, New Zealand, where it is associated with *Leptograptus*,

(4) *Ibid.*
(5) *Ibid.*
(6) *Ibid.*
(7) Keble, R. A., and Benson, W. N. Graptolites from N.W. Nelson. Trans. N.Z. Inst. Vol. LXIX. *In litt.*

Syndyograptus, *Diplograptus*, *Retiograptus*, etc., etc., all of which are suggested in some connection with the doubtful Tasmanian occurrences. Summarising the evidence it would seem that the Tasmanian graptolites are Ordovician, either at the summit of the Lower, or at the base of the Upper, Ordovician (8).

In regard to the Lisle graptolites, so called, Dr. Hall could not do otherwise than regard the record as worthless, but as he pointed out in a previous contribution (9) Mr. Thureau was familiar with graptolites and a skilled collector. He discovered that elegant form *Gonograptus thureaui*, which McCoy made a generic type, and added considerably to our knowledge of the Lower Ordovician fauna. His statement that he saw at Lisle "dark elongated imprints—probably " carbonaceous—in dark blue shales, . . . too indistinct to be " classified . . ." (10) is suggestive, not that the elongated carbonaceous imprints were graptolites, but that graptolites should be found there. Furthermore, a rapid inspection of some slates in the area lead me to the same conclusion.

In correspondence (17/9/28) Mr. Keble added, "After " much consideration I have decided to add something further " regarding the Zeehan graptolites. Were it not that in " collaboration with Dr. W. N. Benson I recently examined " some graptolites from Nelson for the New Zealand Geo- " logical Survey I should have remained quiet. Two con- " siderations prompted me:—

" (1) The prevalence of unusual forms of the *Lep-* " *tograptid* type.

" (2) That the late T. S. Hall accepted *Diplograptus* " as found by Mr. Thureau.

" The specimens are too poor to figure.

" The horizon suggested has proved to be barren in " Victoria in regard to auriferous and other mineral wealth. " It occurs at Bendigo, Sandy's Creek, and Mornington— " always away from payable reefs and alluvial."

(8) It should be pointed out in regard to Mr. Thureau's Strahan occurrence that *Diplograptus* ranges from the middle part of the Lower Ordovician through the Upper Ordovician into the lower part of the Silurian, so that one could reasonably retain a Silurian age for the beds. It is, however, much more typical of the Upper Ordovician.

(9) Hall, T. S. An examination of the Tasmanian Graptolite Record, Report Aust. Assoc. Adv. Sc., v. 7, 1898, p. 401.

(10) Hall, T. S. Evidence of Graptolites in Tasmania. Papers and Proc. Roy. Soc. Tas. 1902, p. 16.

NOTE ON *GAUTIERIA* IN TASMANIA.

By

L. RODWAY, C.M.G.

(Read 12th November, 1928.)

G. tasmanica is a small and rare tuber usually living rather deep in the soil. It differs from *G. drummondi* of West Australia chiefly in the form and colour of its spores. Also it is closely related to *G. parkiana* and *G. trabuli* of North America.

The following brief description sufficiently records it:—

Gautieria tasmanica, n.s. Tuber oblong, 1-2 cm. x 5 mm. Peridium pale brown, extremely thin or none, continuous with the gleba; surface rough with coarse nodules. Gleba from ochre to bright brown, canals broad and tortuous, waxy to fleshy, delicate and easily crumbling; often a slender stem arising from a deep pit on the under surface and extending through the gleba to the apex. Spores brown, smooth, acute or obtuse, 13 x 6 μ.

Near Blackman's Bay, June, 1928.

Gautieria microspora, n.s. Similar in general structure to *G. tasmanica*, but the spores nearly globose and only 5 μ. diameter.

Habitat similar to *G. tasmanica*.

NOTES ON THE GENUS *PORIA*.

No. 2.

By

L. RODWAY, C.M.G.,

and

J. BURTON CLELAND, M.D.

(Read 12th November, 1928.)

THE AUSTRALIAN PORIAS AND PORIA-LIKE FUNGI WITH HYPHÆ NOT DEEPLY COLOURED.

This paper is a continuation of the first of this series which appeared in these Papers and Proceedings, 1928, pp. 31-43. The seventeen species therein dealt with should have been numbered 1 to 17 consecutively. Through inadvertence, other numbers were attached. The present species are numbered 18 onwards. As previously, the names of colours with capital initial letters followed by Roman numerals refer to the plates in Ridgway's *Colour Standards and Colour Nomenclature*, 1912.

With the species here dealt with, we have not found it possible to devise a dichotomous key. In the one presented, we have done our best to help the Australian systematist in "running down" a species. We realise that our effort is a provisional one with only a vague phylogenetic basis. We will welcome, when it can be devised, one which will show more clearly the relationships existing between species and at the same time be of practical value to the worker. The species are obviously often so variable and points of difference so hard to define that the task is a very difficult one.

KEY.

IV. Hyphæ not deeply coloured.

Merulius or meruloid.

Merulius, sterile surface extensive, curling up at edges, whitish, reticulations flesh colour, pale tan or ochraceous tawny .. .. 18. *Merulius corium*

Meruloid, variable, richly coloured (vinaceous cinnamon to brown) .. .. 19. *Poria merulina*

Meruloid, pure white with tendency to brownish discoloration, pores very shallow, orifices rather large . . . . 20. *Merulius candidus*

Irpiciform.

Cinnamon drab to vinaceous drab, when old dark violaceous grey, edges villose to almost byssoid 21. Resupinate forms of *Polystictus* (*Irpex*) *versatilis*

Pore mouths relatively large, 0.5 mm. or more, edge determinate, colour pallid buff .. 22. *Poria subserpens*

Plants more or less brightly coloured with pink, scarlet, orange, or apricot.

Definitely vinaceous pink .. 23. *Poria vinaceo-rosea*

Scarlet to salmon orange .. .. 24. Resupinate forms of *Trametes* (*Polystictus*) *cinnabarinus*

Apricot-coloured (capucine buff, capucine orange), thin, orifices readily recognisable to naked eye .. .. 25. *Poria archeri*

Orange-tinted (warm buff, ochraceous buff, paler than capucine orange) including subiculum, relatively thick (up to 4 mm.), sometimes stratose .. .. .. 26. *Poria subaurantiacus*

Sterile edge white, contrasting with the brown (Verona brown, warm sepia, bone brown, army brown) pore surface . . . . 27. Resupinate forms of *Polyporus dichrous*

Tawny Olive .. 28. Poria-like forms of *Trametes protea*

Spores brown, 8 to 10 x 6.5 to 7 μ., pores dark brown, up to 2.5 mm. deep, sterile edge dirty whitish often with tints of orange, causing a dry rot .. .. 29. *Poria incrassata*

Spores white, large, 13 to 15 x 4.5 to 6.5 μ., usually abundant, plants buff to clay colour, sterile edge white or whitish, variable, sometimes with raised edges, pores usually very oblique .. . . 30. *Poria macrospora*

Spores white, usually abundant, oval or elliptical, 6 to 9 x 4 to 7 μ. Cutting like firm cheese when fresh, often with a phosphorus smell, usually inside burnt trunks, creamy-white becoming brownish, hyphæ thick, soon attacked by insects, spores 6 to 7 x 4 to 6 μ. .. .. 31. *Poria dictyopora*

Firmer, whitish to light buff becoming brownish, determinate, often extensive, not specially attacked by insects, spores thick-walled, 6.5 to 9.5 x 5.2 to 7.5 μ. .. .. 32. *Poria medulla-panis*

Hyphæ very broad, up to 7.5 μ., very irregular, thick-walled, plants white with a cinereous tinge, up to 5 mm. thick .. .. 33. *Poria wakefieldii*

[Not included under the above headings. These will be differentiated in our next part.]

18. *Merulius corium* .(Pers.), Fr.—Forming thin skin-like patches, varying in size according to the substratum from under one inch (2.5 cm.) to several inches long and from ½ inch (1.2 cm.) to 1 inch (2.5 cm.) wide (3ins. x 3-8 in., 6 ins. x ½ in., etc.), usually on the underside of rotting twigs, sticks, bark, and fallen wood, occasionally compacting small twigs, etc., together. The patches are soft when moist, resupinate effused, the margin when old separating from the underlying matrix and becoming free and curled up so that portions can be pulled off like pieces of skin (corium), the fertile surface reticulato-porous, the pores very shallow, first appearing as minute reticulations. The sterile surface extensive, often remaining sterile for long, whitish, the fertile reticulations "flesh colour or pale tan" (Rea), in our plants becoming Ochraceous Tawny (XV.) and darker, near Tawny Olive (XXIX.), etc., when treated with corrosive sublimate—carbolic acid—spirit preservative becoming near Flesh Ochre and Apricot Orange (XIV.). Hyphæ 3.5 to 5.5 μ. thick. Spores elongated, 5.5 to 8.5 x 2.2 to 3.5 μ. Q.—Bunya Mts., October. N.S.W.—On burnt stump, etc., Mosman, April, May, June; on dead tree, National Park, March; Bulli Pass, November. V.—No locality (C. Brittlebank), August. S.A.—Beaumont, May, June, July; Mt. Lofty, June, July; National Park, on fence posts, etc., June; Kalangadoo, S.E., May, 1928. N.Z.—Queenstown, June; Invercargill, June.

19. *Poria merulina*, Berk. The following seems from the description to be this species which is referred to as being "resupinate, effused, orange, subiculum thin, membranace-"ous, tomentose, pores of medium size (360 μ. diam.), dis-"sepiments thin." Forming extensive very thin patches up to 12 x 4 cm. or more, often with outlying islands, on the usually burnt trunks of living stringy bark Eucalypts or on dead wood, varying considerably in colour even from the same locality, with a fairly determinate wavy and irregular paler sterile edge, the surface often irregular following the

underlying roughness of the surface on which it is growing, separable as a slightly tough pellicle. The hymenial surface varies in colour, being near Sayal Brown (XXIX.) and Light Vinaceous Cinnamon (XXIX.) or a vinaceous brown near Army Brown (XL.) and Sorghum Brown (XXXIX.) or Liver Brown (XIV.). The younger portions may be more ochraceous than Orange Buff (III.), the edge being pallid and sometimes in striking contrast. In the Sorghum Brown and Army Brown specimens there is a line of Light Pinkish Cinnamon (XXIX.) inside the paler edge and in the Liver Brown plants a zone near Hazel (XIV.). The edge is finely villose to nearly byssoid. The pores are very irregular, small, from about .2 to .8 mm. in diameter, about 3 in 1 mm., meruloid and shallow or oblique or a little deeper and Poria-like with the dissepiments rounded and relatively thick and sometimes defective. Spores? slightly curved, 5 x 1.8 μ. Hyphæ white, irregular, septate, 3 to 5 μ. in diameter. On living trunks of *Eucalyptus obliqua*, L'Herit., Mt. Lofty, S.A., March, June, and August.

A specimen from Moss Vale, N.S.W., on a dead tree, November, 1918, in colour near Cinnamon Rufous (XIV.) to darker than Hazel (XIV.), the edge paler, identified by C. G. Lloyd (No. 530) as "*Merulius aureus* or very close to it," seems to be the same species. The hyphæ are white, septate, irregular, 3 to 5 μ. in diameter, the branches usually at right angles.

20. *Merulius candidus*, Lloyd.—Lloyd's description (Mycol. Notes, VIII., No. 4, July, 1923, p. 1193) is as follows:—"Pure white, resupinate, with a narrow margin "which on soaking swells and appears gelatinous. Pores "medium large, shallow. Cystidia none. Spores (if cor- "rectly seen) small, 2.5 x 3 μ., hyaline. While I am confident "this is none of our (i.e. American) species, it is not "assuredly a *Merulius*. It may be better classed as a *Poria* "with shallow spores, but we know no such *Poria*."

We describe our portion of the type as follows:—Forming irregular rounded or elongated very thin patches up to 16 x 1.5 cm., resembling splashes of whitewash with outlying spots contrasting with the brown of the dead branchlets on which it is growing. Except where the shallow reticulations of the pores appear, the surface is smooth like that of the glaze on some forms of cotton-wool. The edge is fairly sharply determinate. The pellicle separates with difficulty. Pure white with in places a tendency to brownish discolora-

tion, when effete becoming brownish like a faded leaf. Pores very shallow, irregularly polygonal to elongated, 0.5 to 1 mm. wide, the dissepiments vein-like or as low reticulations. Hyphæ mostly very fine, rather curly, felted, 1.5 to 2 μ. thick, rarely more. N.S.W.—Lorne, near Kendall, September, 1918.

We have other collections which we refer to this species. In these the brownish tint tends to be more evident and the plants are not so tenuous. Milson Island, Hawkesbury R., N.S.W., July, 1912 (Miss Wakefield, No. 12, "*Poria* probably "new"), slightly thicker than the type, white with a tendency to brown discoloration, pores a little deeper; 0.4 to occasionally 0.8 mm. wide, about 1½ in 1 mm., dissepiments moderately thick, not setulose, hyphæ very fine, wavy, 1 to 2 μ. National Park, N.S.W., May, 1919, brownish discoloration more evident, not quite so thin as the type, pores shallow, almost alveolar, very friable, hyphæ slender, 1.5 to 2.2 μ. thick, irregular, sometimes collapsed looking.

The two following may be distinct species. S.A., no locality, 1924, not a pure white, with rusty discoloration at the edges which are more indeterminate, pores deeper and smaller, about 0.25 mm. wide, and dissepiments thinner, spores? subspherical, 4 μ., hyphæ thick-walled, irregular, 2 to 5.5 μ. thick. On worked wood, Sydney, August, the white more dingy especially when young, not quite so tenuous, pores deeper, up to about 0.5 mm. wide, with rounded dissepiments, somewhat friable, hyphæ somewhat irregular, 2 to 4 μ. wide.

21. *Polystictus (Irpex) versatilis*, Berk.—The following resupinate Poria-like form of this species has been kindly identified for us by Dr. James R. Weir. As synonyms for it, he gives *Poria pseudosinuosa*, Henn., *P. byssogena*, Jungh., etc. Forming extensive indeterminate patches, up to 20 x 4 cm., on fallen wood, the sterile mycelium pallid near Light Drab (XLVI.) and villose to almost byssoid, on which appear irregular pore-like elevations more nearly Light Drab which as the plates elongate become Cinnamon Drab to Benzo Brown (XLVI.) and Light Vinaceous Drab (XLV.), when old becoming dark violaceous grey. When young the hymenium is pore-like, the orifices rather polygonal, 0.3 to 1 mm. wide, the dissepiments thin and plate-like, rather jagged and sometimes defective. When old, the pores are more crowded and the dissepiments more irregular and defective. Pores 1.2 to 2 mm. deep, subiculum very thin.

Spores not seen. Hyphæ slightly irregular, thick-walled, slightly tinted, 2 to 4.2 μ. in diameter. On fallen decaying wood, Ooldea, S.A., August, 1922.

22. *Poria subserpens*, Murr.—The following two collections have been kindly identified for us as this species by Dr. James R. Weir. As they differ somewhat in appearance from each other, we describe them separately. (1). Forming sharply determinate, irregular patches from 0.5 cm. up to 9 x 2 cm. in size, with somewhat raised edges and of a pallid dirty buffy tint (near Pinkish Buff and Ochraceous Buff, XXIX.), about 1 mm. thick with context very thin. The pores are rather hexagonal, up to about 1 mm. wide with thin dissepiments. Hyphæ white, 3 to 3.7 μ. thick, varying a little in calibre and with occasional nodular projections. Spores not seen. On the rough bark of fallen boughs, Bullahdelah, N.S.W., August, 1917. (2) Forming sharply determinate neat-looking raised patches up to 15 x 2 cm., of a pale buff colour (a little darker than Pinkish Buff, XXIX.), about 1 mm. thick, with very thin context and very narrow sterile edge of the same colour. Pores rather hexagonal, regular, about 0.5 mm. wide, about 8 in 5 mm., the dissepiments thin and a little rounded. Hyphæ white, a little wavy and varicose, 2 to 3 μ. in diameter. Spores not seen. On fallen branches, Malanganee, 25 miles west of Casino, N.S.W., August, 1917.

23. *Poria vinaceo-rosea*, n. sp.—Forming thin encrusting patches up to 10 cm. or more, covering the lamellæ of decaying *Lenzites repanda*, Mont., and tending to fill up the spaces, a little greyer than Vinaceous Pink (XXVIII.) becoming Terra-cotta (XXVIII.) or darker. The growing narrow-sterile edge is filmy and subarachnoid. Thickness up to 1 mm. Pores very minute, about 4 in 1 mm., orifices rounded, varying slightly in size, dissepiments obtuse, rounded. Rather friable. Hyphæ with a faint tinge of yellow, 2.5 to 5.5 μ. Spores not seen. Q.—Bunya Mts., October, 1919. Miss Wakefield (No. 23) says:—"Probably "new. None of the European forms are as delicate as this." Dr. Weir identified the plant as *P. rhodella*, Fr.

24. *Trametes (Polystictus) cinnabarina*, Jacq.—When growing under adverse conditions, as on old dressed timber, or in an incipient stage, this species may assume a Poria-like appearance. The colour (scarlet, salmon-orange, Dragon's-Blood Red, XIII., near Vinaceous Rufous, XIV.) will suggest *T. cinnabarina*. Teased specimens may show reddish

granules on the hyphæ. Bleached specimens may give trouble, though the context usually retains some colour. We have specimens about 1 cm. in diameter, with the pores well developed, without any bracket-like projection and quite Poria-like in appearance. Poria-like forms:—N.S.W.—In rotting verandah wood, Neutral Bay, Sydney, January, 1920. S.A.—On rotting dressed timber, Encounter Bay, January, 1926.

25. *Poria archeri*, Berk.—The late Dr. C. G. Lloyd, in confirming the identification made by one of us (L.R.), says:—"Only known, I believe, from Tasmania, and peculiar "in its colour, which is apricot orange of Ridgway. No "*Poria* of similar colour occurs in Europe or America. There "are no cystidia and the spores (abundant) are hyaline and "allantoid, about 1.5 x 4 to 5 μ."—Note 851. We describe our specimens as follows:—Widely effused, apricot-coloured (deeper than Capucine Buff, III.; more buff than Capucine Orange, III.; the edge paler; Ochraceous Buff, XV.; between Ochraceous Buff and Ochraceous Orange, XV., darker in places; near Cinnamon, XXIX., faded in parts; Light Ochraceous Salmon, XV., Light Vinaceous Cinnamon, XXIX., to Pinkish Cinnamon, nearly Cinnamon), soft to the touch, vegetative stratum dense of closely felted mycelium about 0.7 to 1 mm. thick, texture somewhat *Xylostroma*-like margin sterile, narrow, dense, byssoid, paler. Tubes shallow, mostly 0.5 mm. deep, dissepiments very thin, irregular, edge setaceous, very irregular and lacerated, pores irregular, about 4 in 1 mm., very oblique where the fruit body is not quite horizontal. When growing in very wet places it is often paler and the sterile border wider. Tasm.—Green's Gully, July, 1912 (confirmed by Lloyd); on dead wood, Cascades, Hobart, May, 1920 and 1925; Mt. Wellington, July, 1920; National Park, January, 1928.

26. *Poria subaurantiacus*, n. sp.—Forming rather indeterminate patches, sometimes with an obtuse upturned margin, up to 7 x 5 cm. in size, of a pale dull orange tint (Warm Buff, XV., to Ochraceous Buff, XV., or paler than Capuchin Orange, III., the ochraceous buff appearing on the under surface), rather soft to the touch, up to 4 mm. thick. Subiculum very thin, the total thickness composed chiefly of the pores which may be stratose. Pores oblique, about 3 in 1 mm., the orifices a little polygonal, dissepiments rather thin, thicker when the tubes are very oblique. Tas.—L.R., No. 8. N.S.W.—National Park, March, 1919.

27. *Polyporus dichrous*, Pers.—Resupinate forms of this species may give rise to trouble in identification. The white border, contrasting with the brown pores (in colour between Verona Brown and Warm Sepia, XXIX.), will suggest *P. dichrous*. We have a specimen from National Park, S.A., July, which has only an exceedingly narrow shelf, with the sterile border not white but Pinkish Buff (XXIX.) and the pores passing from this colour to Snuff Brown (XXIX.), the hyphæ slightly yellow, rather varicose, 2 to 3 μ. thick. A true resupinate form was found by Dr. Cunningham and myself growing under *Pinus laricis* at Waiatapu near Rotorua, N.Z., in February, 1927. This has a narrow white border, the pore-bearing surface being unusually dark (near Bone Brown, XL.) and contrasting strongly with it. Ordinary bracket forms grew in the same locality and in these the colour was more vinaceous (near Army Brown, XL.). A rather weathered specimen growing on a rotting plank of introduced timber at Encounter Bay, S.A., in January, 1926, puzzled us for long till the white edge and dark brown pores gave the clue to its identification. The description of it is as follows:—Forming thin irregular films up to 10 x 2 cm., detachable with difficulty, with sub-byssoid irregular sterile whitish edges, representing the substratum on which the dark brown pores (near Bistre and Sepia, XXIX.) are seated. The white of the edge is rather dingy, and the pores when young are a dirty greyish brown. Thickness less than 1 mm., of which the pores occupy up to about 0.5 mm., and the white context less. Pores very minute, about 7 in 1 mm., orifices rounded, polygonal, dissepiments thin. Rather friable. Hyphæ white, branching at right angles, a little varicose, 2 to 5.5 μ., usually about 4 μ., thick.

28. *Trametes protea*, Berk.—This species usually has a well-marked pileus but resupinate or nearly resupinate forms are occasionally met with, as in plants collected at Mosman, Sydney, in June, 1919. There is merely a narrow, barely evident, shelf along the upper border. The adnate portion is ½ to 1½ in. (1.2 to 3.7 cm.) vertically and several inches laterally in extent, sharply determinate, the edge near Tawny Olive (XXXIX.), the centre darker and greyer, the pores rather glancing, 2.5 mm. deep, varying in depth, the orifices about 0.5 mm., regular, the dissepiments thin and rather rounded. Hyphæ nearly colourless, of irregular calibre, 2 to 3 μ.

Specimens obtained on a dead limb of *Eucalyptus fasciculosa*, F.v.M., at Encounter Bay, S.A., January, 1924,

appear to be the same but more effused and undeveloped, without a sharply defined edge, pores developing along slightly thickened ridges, the narrow sterile edge pallid, the pores darker.

29. *Poria incrassata* (B. and C.), Burt. (Syn., *teste*, C. J. Humphrey.—*Merulius incrassatus*, B. and C.; *M. spissus*, Berk.; *Poria pinea*, Peck; *P. atrosporia*, Ames.)—This is a species causing a "dry rot" in the United States and considerable economic loss in lumber and building wood. It is characterised by dusky-brown spores, 8 to 10 x 6.5 to 7 µ. in size. The pore-surface when formed cracks widely in drying and becomes brownish to blackish-brown, contrasting with the broad sterile dirty-whitish, sometimes orange-tinted, margin. When fresh and exposed to light, the fruit-bodies may vary from orange to pale olivaceous. The mycelium may form extensive fan-shaped sheets, whitish when young, tinged yellowish-olive to brownish when older. Rhizomorphs may be present. A *Poria* found on the underside of rotting imported softwood in a kitchen sink, Neutral Bay, Sydney, October, 1916, resembles closely in its old fruiting surface a specimen of *P. incrassata* kindly forwarded by Dr. C. J. Humphrey. As no spores could be detected, the identification must, however, remain in doubt. Its description is as follows:—Forming a raised rich dark brown mass of pores 3 or 4 cm. in length apparently not seated on any subiculum, the length of the pores attenuating towards the edge. About 2.5 mm. thick, friable. Orifices variable in size, about 3 in 1 mm., rounded, polygonal, dissepiments thin and rounded. Hyphæ indistinct, apparently very thin and in short lengths, felted. Under a kitchen sink on damp softwood, Neutral Bay, Sydney, October, 1916.

30. *Poria macrospora*, n.sp.—At times forming long patches, up to 6 cm. in length, of white sterile subiculum, fairly sharply defined but very thin at the edge, which is not raised, the pores appearing first as faint raised meruloid reticulations, at first white, deepening to buff as they become older, when they are usually oblique from their situation, only in projecting parts pore-like (Encounter Bay, S.A., May, 1927). At other times forming determinate patches up to 7 x 3 cm. with raised sterile tomentose edges, tending naturally to separate a little from the substratum round the periphery but not easily separable artificially, corky, 1 mm. thick, consisting amost entirely of the tubes. The pore-bearing surface is darker than Pinkish Buff (XXIX.), the narrow edge being much paler, of the same tint though nearly

white; when old the surface approaches Clay Colour (XXIX.) (on fallen trunk, Hindmarsh Valley, S.A., January, 1922). In other specimens the colour is near Pinkish Buff becoming Cinnamon Buff (at the base of *Leptospermum pubescens*, Lamk., Morialta, S.A., May, 1925), or near Clay Colour on a whitish background (S.A., probably Mt. Compass). In still other collections on the rough bark of eucalyptus, the plants appear as little patches, a few millimetres to several centimetres in size, occupying the interstices or spreading over them and bearing pores even when very small (National Park, S.A., May, 1926). The pores are usually very oblique, sometimes almost irpicoid and when not oblique, as on a rounded edge, shallow and nearly Hexagona-like, the orifices 0.5 to 1 mm. wide, dissepiments thin, not jagged. Spores white, elongated, with an oblique apiculus and oval gutta, 13 to 15 x 4.5 to 6.5 μ.; hyphæ irregular, sometimes much so, sometimes curly, usually in short lengths, tending to break up into granules, 1.5 to 4 or 5 μ. thick. S.A.—Localities and dates as indicated above; National Park, May, August.

This species, as indicated in the description, is variable, and were it not for the characteristic very large spores and the fact that bridging forms between the extremes may be found in one collection, these extremes might be thought to be distinct species. The large spores are usually readily found and "hall-mark" the species. It may be added that we have hitherto not found any species of Australian *Polyporus* with corresponding spores, so this *Poria* is not likely to be a resupinate form of a *Polyporus*. The large spores do suggest, however, *Hexagona gunnii* and to some extent the two species otherwise may resemble each other, in fact, so much so that it is quite possible that they are closely related phylogenetically. The pores of *Hexagona gunnii* are however typically very large, the context has a darkish tint, and the plants form projecting masses. Occasionally one meets with little pustules a few millimetres in size with the pores rather smaller, but nevertheless decidedly larger than those of the *Poria*, but in such specimens the pustule forms quite a little knob and the smoky brown context can be recognised. In the *Poria*, the supposed relationship may be seen also in a slight tendency for the orifices to be hexagonal.

31. *Poria dictyopora*, Cke.—As indicated under *P. wakefieldii* in this paper, Miss Wakefield has provided a clue to the recognition of *P. dictyopora* in its possessing "peculiar "thick-walled, irregular hyphæ." In this, it is not alone, however, as *P. wakefieldii* possesses similar ones, though the

plant is "very different in appearance." Another clue, however, is available for the recognition of *P. dictyopora* in Cooke's statement (No. 838 in his *Handbook of Australian Fungi*) that it is found "on burnt wood." There is a not uncommon *Poria* in Australia that is usually, though not invariably, found forming large patches on the burnt insides of hollow stumps, and that has spores and hyphæ similar to those found by Miss Wakefield in the type material. The plant is moreover very liable to destruction by insects which probably often gain entrance into it in the field and alters considerably in drying so that Cooke's material would be likely to be defective. Cooke's description will also cover parts of some specimens in our collection, though the more mature portions differ. We feel satisfied that our series represent the true *P. dictyopora*, and so refer them. We thus describe them:—Forming extensive patches, tending to be circular, from a few inches up to nearly 1 square foot in area, when fresh soft and cutting like firm cheese, becoming rigid when dry and then tending to coil up, usually with a distinct smell of phosphorus and often exuding drops of moisture, remaining moist for long, occurring usually on the inside of charred stumps and burnt hollow trunks (usually, if not always, on Eucalypts), occasionally when near the ground encrusting irregularly leaves, sticks, stones, and debris. The tubes creamy white or greyish cream with brown tints as if scorched, becoming brownish to dirty dark brownish when dry. The context when fresh whiter than the tubes, 1 to 2 mm. thick, with occasional specimens much thicker (up to 7 mm.). With a subdeterminate raised tomentose edge. The pore-bearing surface is very shallow up to 1.5 mm. thick, the whitish subiculum forming usually most of the thickness. Developing specimens may show extensive smooth patches on which islands of pores, often vertical, are appearing. Tubes when vertical often irpiciform with the front wall absent and with thin dissepiments on each side, up to 0.5 cm. long, or the dissepiments as parallel narrow ridges up to 1.5 cm. long. When more horizontal, the pores are very shallow meruloid pits (about 2½ in 1 mm.) or a little deeper with thin dissepiments. Spores numerous, white, oval or pear-shaped, 6 to 7, occasionally 5 to 9.5 x 4 to 6 μ. Hyphæ white, thick-walled, knobby, very irregularly bent, branching at various angles, 5.5 to 11.5 μ. N.S.W.—Bradley's Head, Sydney, May; inside burnt log, National Park, May; inside burnt trunk, Terrigal, June. S.A.—Usually on charred stumps, Mt. Lofty, April (lacking the phosphorous smell and remaining white when dry), July (four collections, one with smaller

spores, 4 to 5 x 2.5 μ.); on burnt wood, National Park, May; Knitpo Forest, May (three collections, one on a burnt trunk, another at the base of a stump and extending over surrounding pine-needles, etc.).

32. *Poria medulla-panis* (Pers.), Fr.—Miss Wakefield has identified for us three collections of this species, adding "well characterised by its large thick-walled spores," and Dr. James R. Weir has also identified one collection. We infer that the spore measurements (3 to 4 x 1.5 to 2 μ.) given by Rea in his *British Basidiomycetes* are far too small. The Australian plants seem to form larger patches than the British ones described by Rea. They also show a preference for growing on species of *Banksia* (*Proteaceæ*), a genus peculiar to Australia, though other dead branches are much more abundant. This predilection for *Banksia* wood occurs in two widely separated States (N.S.W. and S.A.).

We describe Australian specimens as follows:—Forming extensive, fairly sharply determinate, firmly adherent patches up to 30 x 5 cm. in size and 1 to 5 mm. thick, sometimes cracking on the surface. In colour Light Buff (XV.), or between this and Warm Buff (XV.), or Light Buff becoming warmer when bruised, or the surface white with a tinge of Light Buff with the context Warm Buff and becoming Warm Buff when bruised, when old with darker stains and often with a dark brown or scorched brown edge tending to be cracked, the surface in some cases turning yellowish or mustard colour on scratching or bruising and brownish when emulsified. The sterile edge may be narrow or more extensive, depending on the age, and in one case we have an extensive very thin white patch, 10 x 1.5 cm. in size, of sterile surface on which here and there very minute shallow pits are developing whilst another branch collected at the same time had the pores well-developed but in a thin layer. The pores are up to 3 mm. long, straight and shallow, or oblique, with very little context which is whitish and passes into the white mycelium penetrating the wood. The pore orifices are very minute, about 3 to 4 in 1 mm., the dissepiments thin when growing obliquely, rounded and nearly the diameter of the pores when horizontal. The spores are abundant, sometimes forming most of the hymenial substance in teased scrapings, whitish or very slightly tinted, thick-walled, oval or elliptical, 6.5 to 9.5 x 5.2 to 7.5 μ. Hyphæ whitish, irregular, sometimes varicose, sometimes collapsed-looking, branching irregularly, 1.8 to 3.5 μ. thick. On dead branches and fallen wood.

N.S.W.—Suspension Bridge, Sydney, on dead *Banksia* and Eucalypt wood (identified by Miss Wakefield, No. 24); Middle Harbour, Sydney, September, 1918; Bradley's Head, Sydney, April, 1919; on dead *Kunzea*, same locality, April, 1919 (turning yellow when bruised); on Epacrid shrub, Milson Island, Hawkesbury R., March and July; Milson Island, August, 1914 (turning yellow when bruised, identified by Miss Wakefield, No. 19); Hawkesbury R.; National Park, March, 1919 (turning yellow if scraped when moist), and May; Comboyne, September, 1918; N.S.W., no locality, returned by Miss Wakefield (No. 26) as indeterminable, surface becoming dirty pallid brownish but the spores and other features link it on to our other Australian collections; two other collections without localities.

S.A.—Mt. Lofty, on dead *Banksia marginata*, Cav., February, 1920 (identified by Miss Wakefield, No. 25); Mt. Lofty, on dead branch of living *B. marginata*, July, 1925.

N.Z.—We have collected what appears to be a thin form of this species at Wellington in May, 1922. The usually abundant typical spores were not, however, seen.

C. J. Humphrey has kindly forwarded to us two collections identified as *Poria subacida*, Peck. No. 1,814 is thin, 2 to 3 mm. thick, whereas No. 10,379 is 11 mm. thick. We have three collections which agree closely with these specimens. The spores appear a little larger (6.4 to 4.8 instead of 5.5 μ.), the hyphæ seem a little thicker (3 μ. instead of 2.5 μ.) and the pore mouths are probably a little smaller. After full consideration we consider them as examples of the Australian form of *P. medulla-panis*, though the spores are smaller. The specimens collected at Hindmarsh Valley, Encounter Bay, in January, 1922, form patches, 10 or more cm. long x 4 cm. wide, of a dirty discoloured or bruised-looking pallid whitish colour, up to 7 mm. in thickness, the edge sharply defined and shelving. There is practically no context and the pores have been produced in layers. The pore orifices are very minute. Spores subspherical to oval, 4.8 to 6.4 μ.; hyphæ white, varying in calibre, about 3 μ. thick. Another collection, apparently the same, is from National Park, April, 1924, and the third is probably from Flinders Island, Bass Strait.

33. *Poria wakefieldii*, n.sp.—In identifying a *Poria* (No. 20) for us, Miss Wakefield (No. 20) says:—"This specimen "has the same peculiar thick-walled, irregular hyphæ as "the type material of *Poria dictyopora*, Cke., though it is

"very different in appearance. Cooke's material, however, "is so obviously badly developed and probably abnormal, "that it seems legitimate to suppose that this is the more "fully developed form of the plant. The spores, as far as "they have been seen, agree fairly well also. In *P. dictyopora* "they are ovate, with a pointed apiculus at the base, slightly "depressed on one side as seen laterally, about 6 to 7 (to 8) "x 4.5 to 5 μ." Our specimen is old and is now fragmented into small separated masses 3 cm. or less in size. They were originally attached to decaying wood, apparently of a *Banksia*, on and in which are still present small white thin subtomentose patches on some of which very minute and shallow pores are seated. This part agrees fairly well with the description of the species as given in Cooke's *Australian Fungi* (No. 838). The larger matured portions are white with a cinereous tint, becoming discoloured a dingy grey near the surface probably from commencing decay. The thickness is up to 5 mm., consisting chiefly of the pores (3.5 mm. deep), beneath which is a thin tomentose whitish subiculum up to 1 mm. thick. The orifices are minute, 0.16 to 0.25 mm., about 3½ to 6 in 1 mm., rather angular, the dissepiments thin and acute or somewhat rounded. The hyphæ are thick-walled, very irregular, sometimes curved or knobby, with the calibre varying in individual hyphæ, 2.5 to 7.5 μ. thick, with smaller fragments of mycelium about 2 μ. thick, with branches coming off irregularly, some at right angles and some at acute angles. Middle Harbour, Sydney, September, 1918. As indicated under *P. dictyopora* in this paper, we feel satisfied that another commoner species is the true *P. dictyopora* and that Miss Wakefield's No. 20 is quite distinct from it. Under these circumstances we have pleasure in giving this plant a specific name appreciative of Miss Wakefield's work in mycology.

ON SOME DIMINUTIVE TYPES OF TASMANIAN STONE IMPLEMENTS.

By

R. W. LEGGE, Cullenswood.

Plates V.-IX.

(Read 12th November, 1928.)

It is the object of this paper to attempt to give a detailed description of some of the smaller forms of stone implements made by the extinct Tasmanians, which, on account of their comparative scarcity and diminutive size, have hitherto not figured prominently in discussions relative to Tasmanian Stone Culture, of which they constitute a very important feature.

Many of these tiny examples of Aboriginal stone-craft exhibit a high degree of skill in their manufacture, with their delicately chipped edges and cleverly fabricated points, and as an undoubted analogy exists between them and some Mainland forms, they deserve full consideration from students of Ethnology and Archæology, especially in their relation to Tasmania.

For purposes of description here, these miniature implements may be divided into three main types, which will be called, respectively, Planes, Gravers & Borers, and Scrapers, all of which have their distinct prototypes in the ordinary more or less well-defined forms which occur in and around all the chief native camping grounds on the East Coast and Midlands.

Whatever may have been the uses of these tiny implements, if they had any real usage at all, it is hard to understand, and unsafe to dogmatise upon, for knowing what we do of the Tasmanian weapons, the spear and waddy, and of the native handicrafts, such as basket and necklace making, there does not seem to be any useful purpose to which they can have been put.

One may perhaps hazard the conjecture that these pygmy tools were but models of their larger prototypes, made whilst working up the latter, from suitable flakes, and given to the children to serve as playthings, and possibly to keep them from pilfering the larger ones lying about the camp. No

one who has ever watched a little party of Australian Aboriginal children sitting on the sand at play, laughing and chattering, is likely to doubt the likelihood of our vanished native children having disported themselves at play, also, especially in such sheltered surroundings as those which obtained for them at Long Point on the East Coast, for instance. I mention this locality because it has proved by far the most prolific in yielding the material which forms the subject of this paper, especially in respect to Type B. Gravers & Borers, some remarkably fine specimens of which have been selected to illustrate this paper.

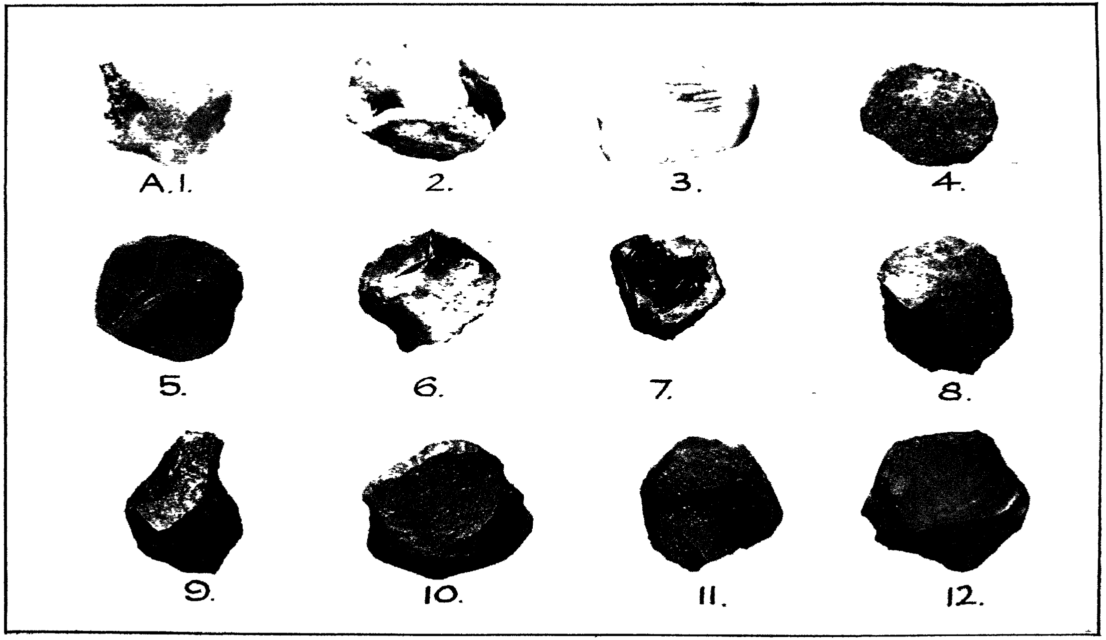
TYPE A. SCRAPERS.

Taking Type A. *Scrapers* first, a series of 12 examples is shown on Plate V., with a list giving the measurements, nature of stone from which they are made, and the locality whence obtained.

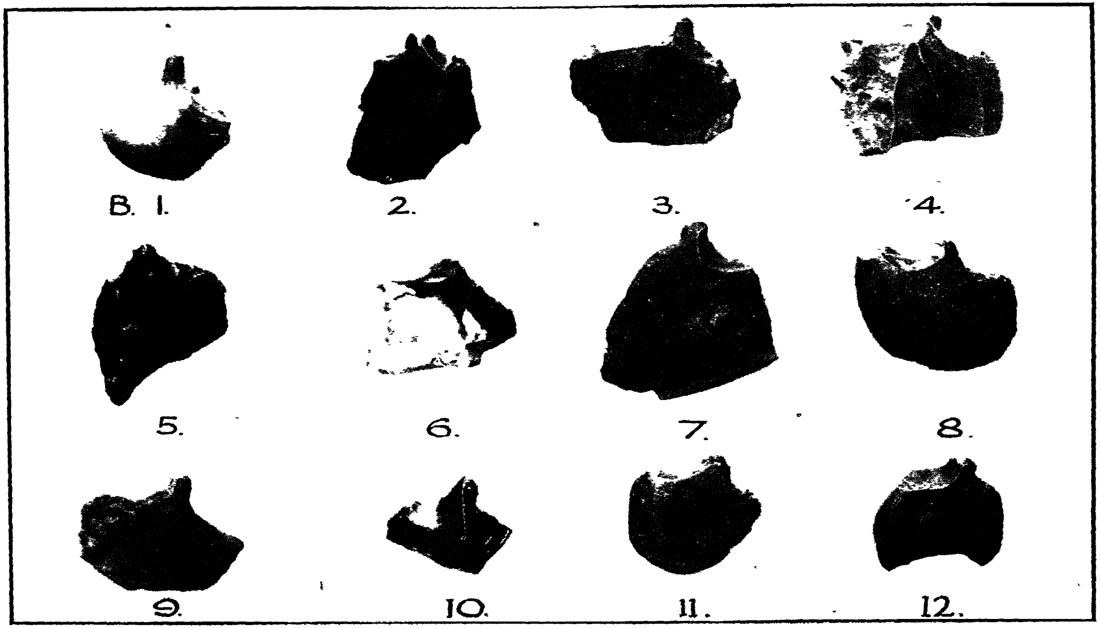
This series may be taken as a very fair representation of the type under review. Four of the specimens, Nos. 1, 2, 6, and 7, are of rather attractive appearance. The stone, Chalcydone, from which they are made, seems to have been a favourite material with the native stone-knappers, especially in the large camps in the vicinity of Tunbridge, where they were particularly partial to it, judging from the quantity of flakes to be found on and around the chipping mounds. One such mound which has come under the writer's notice is made up entirely of flakes and fragments of orange-tinted and pearly Chalcydone. A careful investigation of this mound and of the sand upon which it stands, yielded a number of small flakes which bear distinct traces of secondary treatment to their edges. Whether it was the ornamental nature of this stone which appealed to the natives, or its particular suitability for flaking, the writer does not propose to say, but the fact remains that any flake showing the least trace of symmetry, no matter how small, was generally picked out for secondary treatment, and doubtless the numbers of untreated sharp flakes were much in demand for use as lancets for making the cicatrices on arm and chest, so much affected by the natives, and possibly for blood-letting, which practice was, we understand, much resorted to for the relief of pain.

TYPE B. GRAVERS' OR BORERS.

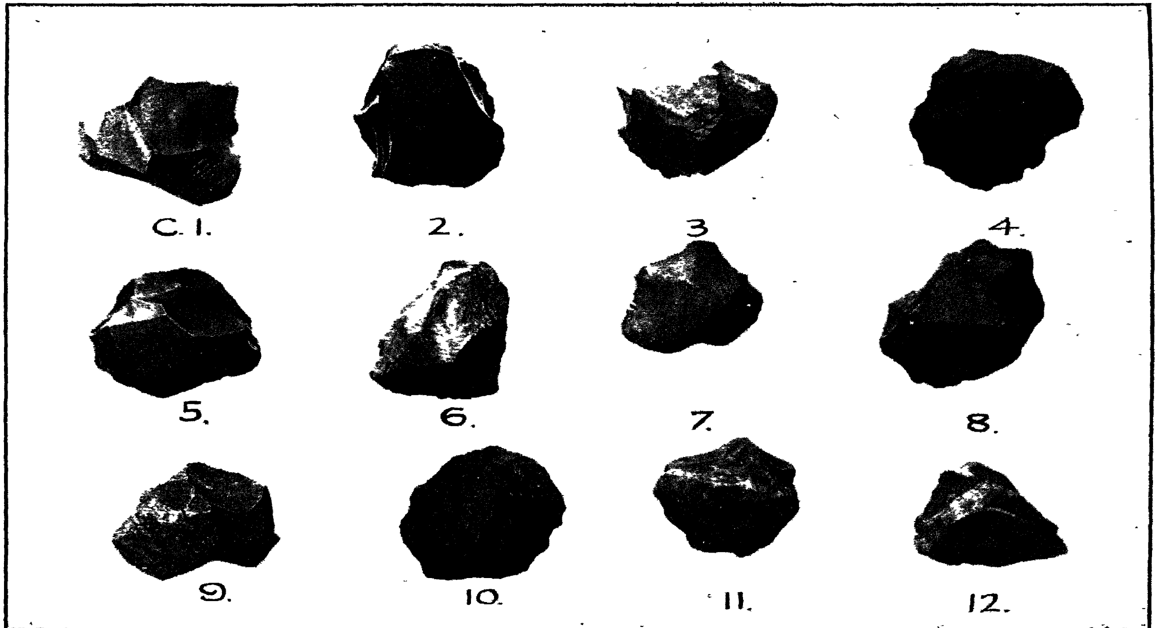
This type, which is illustrated on Plate VI., by 12 examples, is of absorbing interest. It has its exact prototype in



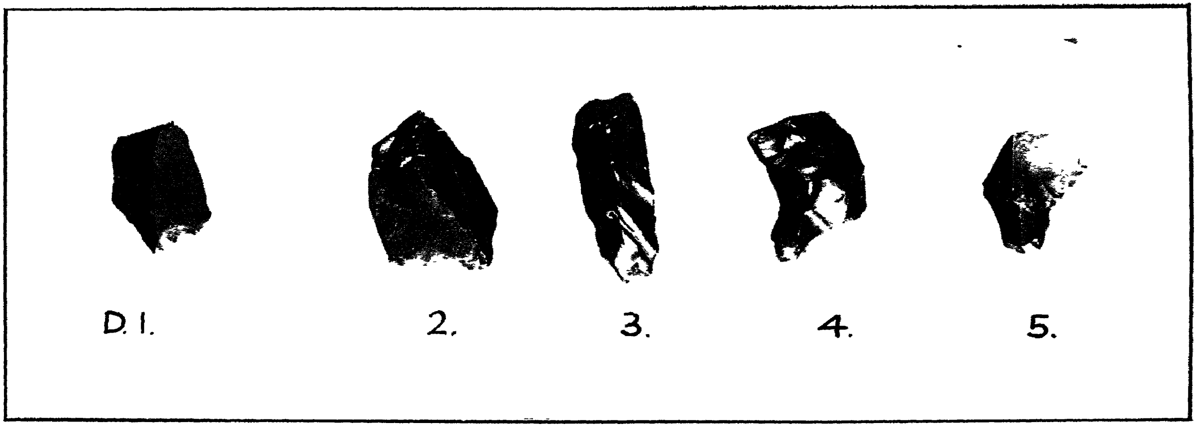
Tasmanian Stone Implements.



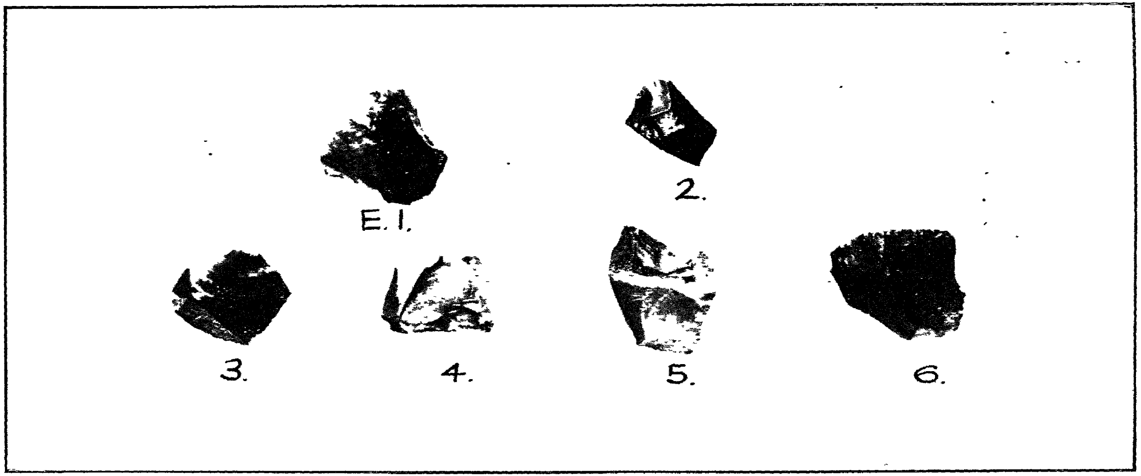
Tasmanian Stone Implements.



Tasmanian Stone Implements.



Tasmanian Stone Implements.



Tasmanian Stone Implements.

the larger forms, which are not uncommon and which deserve special mention and description themselves. The student cannot examine these delicately fabricated and diminutive implements without being greatly impressed by the high degree of skill and care which their manufacture exhibits, as also by their uniformity to type.

In the specimens shown, there is but one point in evidence, although in a number examined, there are often two, and in some cases even three will be found, giving the piece quite a star-like appearance.

Of the different forms to be described herein, this one, Type B., seems to be the most likely to have been put to some actual use, such evident pains having been taken to fashion their small points, that there surely must have been a definite purpose in view for them. Perhaps it was to make the grooves on the waddy handles in order to give a better grip?

This type is so persistent in certain localities on the East Coast, notably at Long Point, that it appears to have been a favourite with the stone-knappers who worked there, and in the opinion of the writer the delicate chipping necessary to perfect and finish these tiny points, was done with bone tools, and perhaps, like in the case of the Wonkonguru and Dieri of the Lake Eyre Basin, an odd refractory chip was removed by the teeth (Horne and Aiston, *Savage Life in Central Australia*).

In many instances the chipping of the edge is so minute as to necessitate the use of a good magnifying lens to detect it, this pointing to the wonderfully keen eyesight the makers possessed.

TYPE C. PLANES.

Taking Type C. next in order, the so-called Planes, we have the miniature of a very distinctive type, and one which is somewhat of a puzzle in itself.

There are 12 examples also of this type, which are shown on Plate VII., and which reveal remarkable conformity and likeness. It appears as if the intention was to have every fraction of the edge of the base made sharp by chipping.

A study of these 12 specimens gives the impression that the object in view was to obtain an implement that would provide a sharp edge for rubbing or smoothing off a flat surface, something upon which considerable pressure was required.

The writer has found this type exactly on the sites of the ancient camps of the once great Dieri tribe, and two of these will be exhibited to show the remarkable analogy existing between them and the Tasmanians. Consultation with Mr. Aiston on the subject of these "Grattcirs Tarté" did not have a very convincing effect upon the writer, for Mr. Aiston declares most emphatically that, both large and small, these are nothing but cast-away cores from which flakes have been struck for knives, and that they are not implements or tools in any way.

In these Tasmanian examples, however, it is hard to understand or credit that if they are but cores, why have they the carefully chipped edges to their bases, and why do they conform so regularly to type? The photographs do not give the best impression of the conical form of most of the units comprising the type, for the bases are in nearly every case almost flat.

TYPE D. SUB-TYPE OF TYPE B.

Having dealt with the three main types, Scrapers, Gravers, and Planes, let us now examine the five small flakes, illustrated on Plate VIII., which come under the heading of Type D., but which are more a sub-type of Type B.

These five pieces which were all found within an area of two to three square yards, in the sand between two small hillocks at Long Point, all show distinct traces of pressure flaking at the points, which is clearly seen from the photographs on Plate VIII., which serves to illustrate them.

Again the question arises, what was the object in touching up these diminutive flakes in this way? What uses, if any, were they put to?

These are the only pygmy implements of this kind that the writer has come across. Their diminutive size rather precludes the likelihood of many of them being found, although the writer has seen numbers of beautifully made specimens no larger, from the Woolbrook camps on the S. coast of Victoria, though these conform more to a definite type, sometimes known as "thumb-nail" scrapers, which are not uncommon in different parts of the mainland.

TYPE E.

Since the photographs on Plate IX. were taken earlier in the present year, some 15 more of this type have been col-

lected. The type is remarkable in that the secondary treatment is found on the outer edge of the plane of percussion, giving the flakes a somewhat gouge-like appearance. The chipped edge is in most cases found to be convex, whilst in others, as in fig. 4, Plate IX., it is decidedly concave.

The type is comparatively rare, but is of peculiar interest on account of the probable usages for it even being hard to guess at. It would almost seem as if the native stone-knappers just had to make an attempt to chip up any flake, no matter how small, if it would lend itself in the least degree to the process.

There is certainly a protoype in the larger implements though this also is of rare occurrence.

Is it possible that the chipping to the edges was done *before* the flake was struck off the matrix? This hypothesis does not appear to be a sound one to the writer.

In conclusion it may be said that there is still a wide field for the investigation of these miniature implements, and it is to be hoped that this paper may help to pave the way for further research. If it does, then it will not have been written in vain.

DESCRIPTIVE LIST.

TYPE A. PLATE V.

Measurements in millimetres.

A 1. Chalcydone. Tunbridge. 24 x 20 x 10.
A 2. Chalcydone. Tunbridge. 25 x 20 x 7.
A 3. Porcelainite. Tunbridge. 24 x 19 x 4.
A 4. Quartzite. Tunbridge. 20 x 18 x 4.
A 5. Chert. 4 Mile Creek, E. Coast. 22 x 21 x 4.
A 6. Chalcydone. Tunbridge. 22 x 20 x 9.
A 7. Chalcydone. Tunbridge. 18 x 15 x 6.
A 8. Quartzite. Tunbridge. 25 x 19 x 7.
A 9. Quartzite. Tunbridge. 26 x 17 x 12.
A 10. Chert. Seymour. 25 x 25 x 6.
A 11. Quartzite. Tunbridge. 21 x 20 x 6.
A 12. Chert. Seymour. 26 x 23 x 5.

TYPE B. PLATE VI.

B 1. Chert. Long Point, E. Coast. 30 x 24 x 7.
B 2. Chert. Courland, E. Coast. 34 x 21 x 8.
B 3. Chert. Courland, E. Coast. 32 x 30 x 9.

B 4. Chert. Ironhouse Pt., E. Coast. 35 x 31 x 7.5.
B 5. Quartzite. Long Point, E. Coast. 36 x 24 x 7.
B 6. Chalcydone. Tunbridge. 27 x 27 x 11.
B 7. Chert. Long Point, E. Coast. 39 x 30 x 8.
B 8. Chert. Long Point, E. Coast. 28 x 30 x 8.
B 9. Chert. Long Point, E. Coast. 28 x 30 x 6.
B 10. Petrified Wood. Unknown. 20 x 21 x 8.
B 11. Quartzite. Long Point, E. Coast. 27 x 23 x 5.
B 12. Chert. Long Point, E. Coast. 28 x 23 x 6.

TYPE C. PLATE VII.

C 1. Chert. Long Point, E. Coast. 35 x 26 x 27 high.
C 2. Chert. 4 Mile Creek, E. Coast. 35 x 26 x 27 high.
C 3. Shale. Ironhouse Pt., E. Coast. 29 x 30 x 23 high.
C 4. Shale. Bicheno, E. Coast. 32 x 26 x 18 high.
C 5. Chert. Long Point, E. Coast. 31 x 30 x 16 high.
C 6. Chert. Long Point, E. Coast. 33 x 22 x 23 high.
C 7. Chert. Long Point, E. Coast. 22 x 23 x 19 high.
C 8. Chert. Long Point, E. Coast. 35 x 26 x 17 high.
C 9. Shale. Ironhouse Pt., E. Coast. 29 x 22 x 24 high.
C 10. Shale. Long Point, E. Coast. 33 x 28 x 17 high.
C 11. Chert. Ironhouse Pt., E. Coast. 26 x 27 x 20 high.
C 12. Silicate. St. Helens Pt., E. Coast. 24 x 21 x 29 high.

Measurements in this type given for the two greatest diameters across base, and height.

TYPE D. PLATE VIII.

D 1. Shale. Long Point, E. Coast. 20 x 14 x 4.
D 2. Shale. Long Point, E. Coast. 25 x 16 x 4.
D 3. Shale. Long Point, E. Coast. 28 x 9 x 5.
D 4. Shale. Long Point, E. Coast. 23 x 12 x 5.
D 5. Shale. Long Point, E. Coast. 19 x 11 x 3.5.

Photos in this plate slightly reduced size.

TYPE E. PLATE IX.

E 1. Chalcydone. Tunbridge. 23 x 22 x 10.
E 2. Chert. Long Point, E. Coast. 13 x 15 x 8.
E 3. Chert. Long Point, E. Coast. 20 x 19 x 6.
E 4. Chert. Long Point, E. Coast. 20 x 16 x 2.
E 5. Chert. Long Point, E. Coast. 27 x 20 x 9.
E 6. Chert. Long Point, E. Coast. 25 x 20 x 8.

Photos by Beattie, Hobart.

NOTES ON THE SEA ELEPHANT (*MIROUNGA LEONINUS*)

By

H. H. Scott, Curator of the Queen Victoria Museum, Launceston,

and

Clive Lord, Director of the Tasmanian Museum, Hobart.

Plates X.-XIV.

(Read 12th November, 1928.)

A single specimen of the Sea Elephant (*Mirounga leoninus*) visited the East Coast of Tasmania recently, and was killed later by certain residents of Wedge Bay, Tasman Peninsula. Its skeleton was secured for the Tasmanian Museum Collection.

This is the first record of this species visiting the island for many years. Our historical records show that in the early days of last century Sea Elephants occurred at such places as King Island, Bass Straits, but excessive hunting exterminated these large mammals, and Macquarie Island is now their nearest home, so the lone straggler from the South must have had a long voyage before reaching these shores. It would be interesting to know the usual range of this species from its ordinary breeding grounds. Sea Leopards (*Ogmorhinus leptonyx*) visit Tasmania fairly frequently, as well as occasional Crested and King Penguins, so there must be a fair proportion of Subantarctic types which wander northwards.

OSTEOLOGY.

The skeleton is of interest. The skull is very massive, and follows the general characteristics of the marine carnivora, except for the recessed nasals, flat maxillary areas, and extensive narial basin, all of which features relate to the trunk of the Sea Elephant, and therefore differ from the usual seal type.

The premaxillaries articulate with the maxillaries by harmonia, the sutures running straight backwards for 146

mm., as they form the floor of the narial basin. Mesially they embrace the vomer, which is exposed for 40 mm., and although 32 mm. wide it is so overlapped as to appear much less. The vomer is not seen in the palate, as with so many of the *Delphinidæ*. The meso-ethmoidal nasal septum, which is part of Professor Owen's prefrontal element, is an important feature in this area of the skull, projecting as it does upwards and forwards, to form a pillar for the recessed nasals to rest upon. Measured as a bony pillar it is 121 mm., with a basal width of 38 mm., and an anterior-posterior length of 41 mm. From the abacus of this pillar, the nasals curve downwards, throwing out two lateral processes that indicate the anterior orbital boundary. In this skull the parietals hardly develop any crest at all, and are slightly open upon the central line, which feature is almost certain to be an age character.

Into this cavity the frontals throw backward two bars of bone, 52 mm. long, and one naturally gets the idea that the suppressed interparietal may to some extent have coalesced with them, but nothing short of a young skull could solve the problem. The occipital regions are remarkable, chiefly, for the area of bone roughened for the attachment of the *ligamentum nuche*; the total measurement of this surface being 280 mm. long, and 45 mm. wide.

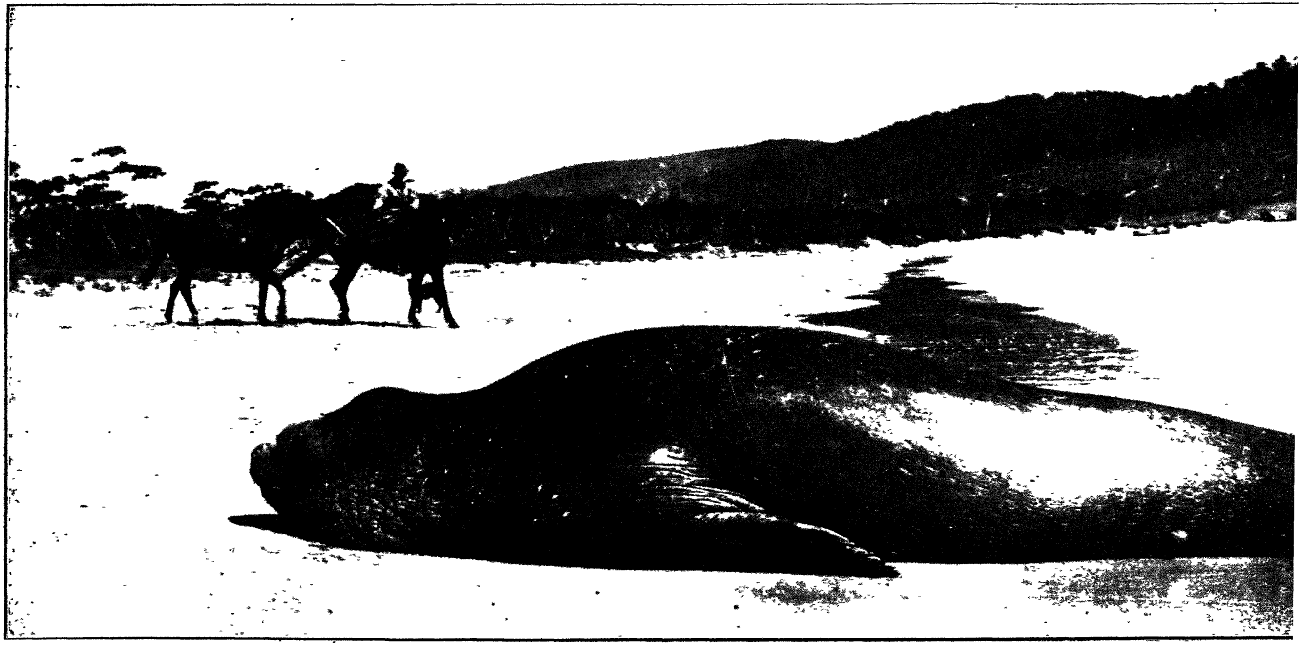
The malar throws up a post-orbital process, which is 130 mm. in width, and it encloses the massive process of the squamosal for a length of 115 mm. In the bony palate the premaxillaries claim the first 90 mm., the maxillaries the next 160 mm., and the palatines the remaining 32 mm. The pterogoids have not coalesced with the palatines, or with the sphenoids—their hamuli, internally, roof a groove 44 mm. long.

The tusks in this macerated skull are exposed for 70 mm., and have a basal girth of 136 mm.

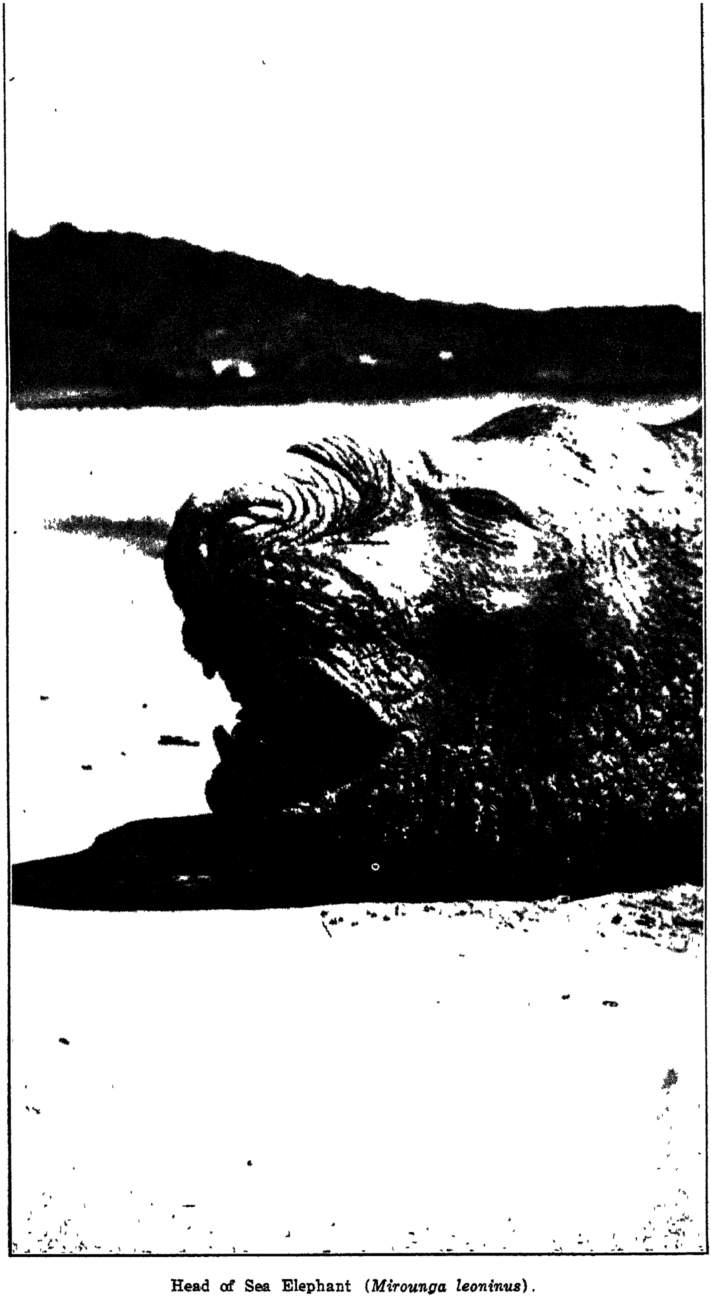
So deeply is the supra-occipital recessed that a line drawn across the condyles is removed 83 mm. from the skull wall.

The mandible has a total length of 412 mm. The symphysis has a vertical height of 160 mm., and although so massive is not ankylosed to sutural extinction, a second proof that, although adult, the skull is not super-ossified to its full limit, and in this individual specimen the rami had to be bolted together for Museum exhibition purposes.

Sea Elephant (*Mirounga leoninus*) on the East Coast of Tasmania, 1927.



Sea Elephant (*Mirounga leoninus*) ashore on the East Coast of Tasmania, 1927.



Head of Sea Elephant (*Mirounga leoninus*).

Sea Elephant (*Mirounga leoninus*), East Coast, Tasmania

Mirounga leoninus, showing posterior dorsal region, Wedge Bay, Tasmania.

The coronoid process is low, and extends backwards rather than forwards, and only rises 88 mm. above the condylar platform.

TABLE OF USEFUL MEASUREMENTS.

Total length of skull, including curved tusks.. ..	571 mm.
Width of zygomatic processes	400 mm.
Width across orbital processes of the maxillaries..	183 mm.
Width across maxillo-maxillary regions	183 mm.
Length, in a straight line, of curved nasals.. ..	66 mm.
Width of narial basin	110 mm.
Length from nasal septum to incisor rim	165 mm.
Total length of palate (central line) without teeth	280 mm.
Greatest width of the palate..	177 mm.
Skull width at glenoid regions	353 mm.
Basi-occipital depression to palatine nasal	29 mm.

DENTAL FORMULA.

Skull	I. 2.	C. 2.	P.M. 2.	M. 4.
Mandible	I. 2.	C. 2.	P.M. 2.	M. 3.
Total				38.

STUDIES IN TASMANIAN SPIDERS.

PART III.

By

V. V. HICKMAN, B.A., B.Sc.

Plates XV.-XVII., and Nine Text Figures.

(Read 12th November, 1928.)

Family AVICULARIIDÆ.

Sub-Family MIGINÆ.

Genus *Migas*, L. Koch.

Migas nitens, Hickman.

Plate XV.

In December, 1925, I found at Derwent Park near the shore of Prince of Wales Bay a small colony of trap-door spiders belonging to the genus *Migas*, L. Koch. The species proved to be new, and I described a female specimen under the name of *Migas nitens* (1). Several specimens were collected and preserved in alcohol, but one was kept alive in order that its habits might be observed. A small flower pot, filled nearly to the top with earth, served as the spider's new home. After examining its unusual surroundings the spider started to make a burrow between the earth and the side of the pot, using the powerful curved spines on the front legs to dislodge the particles of earth. In due course the burrow was fitted with a lid and lined throughout with silk.

The flower pot was placed in my study so that the spider could be kept under close observation. During the day time it never left the burrow. At night it would sometimes come to the entrance of the nest and raise the lid a little, but when disturbed would at once close the lid and hold fast to the inside to prevent my opening it. In order to feed the spider the lid had to be forcibly opened and a small fly pushed into the burrow. *Migas nitens* proved very moderate in its food requirements and seemed quite satisfied with one small housefly per mouth. The menu was varied occasionally by substituting a small garden spider in place of the fly. The remnants of the repast were always cleaned out of the burrow by the spider and carried some distance away from the entrance. No cover was placed on the flower pot and if the amount of food had been insufficient the spider would have left to look for a more plentiful supply elsewhere.

During two and a half years *Migas nitens* lived in the flower pot in my study. The soil, in which the burrow was made, was occasionally moistened with water. After the earth had become quite soft the spider would come to the entrance and enlarge the opening of the burrow. On the 17th June, 1928, I was surprised to notice that the lid of the burrow had been removed and carried a short distance away. Fearing that the little Avicularid had left at last, I placed a live fly in the opening of the nest and to my astonishment a fully developed male specimen of *Migas nitens* rushed out. When found in December, 1925, the spider was immature, and I was not sure as to whether it was a male or a female. During the two and a half years spent in the flower pot it had reached maturity and turned out to be a male specimen. I now realised that the removal of the lid from the nest signified that the spider intended to occupy the burrow no longer and was about to start on its wanderings in search of the female. Not wishing to lose the specimen I transferred it to alcohol. A description of it is given below.

Measurements in millimetres (excluding the falces).

Total length	7.6
Length of Caphalothorax	3.1
Breadth of Cephalothorax	3.1
Length of Abdomen	4.2
Breadth of Abdomen	2.8

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	1.3	4.1	4.3	3.0	12.7
2	1.2	3.8	3.8	2.8	11.6
3	1.1	2.7	2.9	2.7	9.4
4	1.3	3.6	4.1	3.6	12.6
				Tarsus	
Palpi	1.1	1.8	1.7	0.5	5.1

Cephalothorax: Brown, hairless, arched but not as much as in the female. In outline it is almost circular, the breadth being nearly equal to the length.

Pars Cephalica: Slightly arched, very gently ascending, provided with a single median row of bristles and a pair of erect bristles in front of the fovea as in the female; segmental groove distinct but not deep.

Ocular Area: More than twice as broad as long, slightly arched, the front median eyes occupy a raised, oval, dark space in the centre, while on each side of this is a black space occupied by the lateral eyes and a rear median eye. The bristles on the ocular area are arranged as in the female.

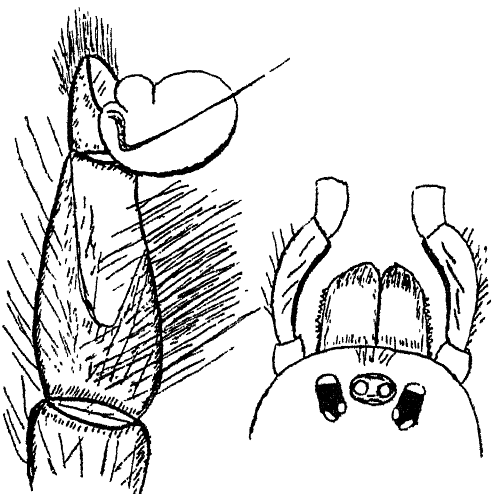
Clypeus: Wide, sloping forward, provided with a tuft of bristles in front of the median eyes.

Pars Thoracica: Lateral slope not very steep, devoid of hairs and bristles; radial grooves well marked.

Thoracic Fovea: Deep, recurved, its rear margin is indented and higher than its front margin.

Marginal Band: As in the female.

Eyes: Arranged in two rows. Viewed from above the front row appears straight and the rear row recurved. The front row is slightly longer than the rear row. The front median eyes are round and are separated by a distance slightly less than half their individual diameter. The front laterals are the largest of the group, being slightly larger than the front medians, from which they are separated by a space equal to that between the front medians. The elliptical rear laterals and rear medians are about the same size, their long diameter being a little smaller than the diameter of a front median eye. They are close together but not actually contiguous. The front and rear laterals are separated by a distance equal to one and a half times that which separates the front medians. The space between the rear medians is equal to nearly four times that between the front medians. (See Text Fig. 1 B.)



A. B.

Fig. 1. *Migas nitens*, Hickman, ♂.
A. Left palpus viewed from below. B. Front of cephalothorax showing eyes, and stridulating organ on falces.

Legs: Relative lengths 1, 4, 2, 3, the first and fourth being almost equal in length. Concolorous with the cephalothorax upper side of femoral segments provided with a row of four or five coarse bristles. Leg 1 has a row of two straight spines on the inner side and four curved spines on the outer side of the tibial segment, also a small spine on the outer side of the patella near the apex. Leg 2 has a row of three or four spines on the outer side of the tibial segment and a small spine on the patella as in leg 1. No other spines are present on the legs of the fully developed spider, but in the immature state it is armed as in the female. Apparently the powerful armature of the female is possessed by the male until it moults its skin for the last time, after which it abandons the burrow and no longer needs the spines for digging purposes. The tarsal segments and the distal half of the metatarsal segments of legs 1 and 2 are provided with a light scopula. All the legs are lightly clothed with short hairs and fine bristles. The superior tarsal claws of legs 1 and 2 are provided with a row of six teeth, those of leg 3 with a row of three or four teeth and those of leg 4 with two large teeth. The inferior tarsal claws are bare.

Palpi: Much longer than the cephalothorax, devoid of spines but lightly clothed with short hairs. The underside of the tibial segment is furnished with long thin bristles, whilst the upper side of the femur is provided with a longitudinal row of four or five spine-like bristles resembling those on the femoral segments of the legs. The inner side of the femur is provided with a hard longitudinal ridge. The genital bulb consists of two lobes, one much larger than the other. The larger lobe gives rise to a long thin style, which is scarcely thicker than a bristle. This style projects from the inner side of the lobe and crosses it transversely. (See Text Fig. 1 A.)

Falces: Moderately strong, prominent, very dark brown, upper surface bare, a few short hairs in front, no rastellum. Fang moderately long, well curved and reinforced with ridges. Five small teeth on the outer edge of furrow and two large teeth on the inner edge.

Stridulating Organ: On the outer side of each falx there is a longitudinal row of teeth. The teeth composing the row are small, conical, and about fourteen in number. They rasp against the hard ridge on the inner side of the femoral segment of the palpus. (See Text Fig. 1 B.)

Maxillæ: Light brown, strongly diverging, furnished with a beard of reddish hair along the inner margin. The inner fore angle is produced to a subconical point. No spines present.

Labium: Brown, broader than long, rounded in front, devoid of spines but furnished with black bristles; it is separated from the sternum by a curved groove.

Sternum: Yellowish brown, broadly pyriform, thinly clothed and fringed with black bristles.

Sigilla: Posterior pair as in female; the others not visible.

Abdomen: Ovate, lightly clothed with short black hairs, upper surface dark brown, under surface yellowish brown; anal tubercle large.

Spinnerets: As in the female.

Locality: Prince of Wales Bay, Derwent Park. December, 1925.

Sub-Family DIPLURINÆ.

Genus *Hexathele*, Ausserer.

The Nest of *Hexathele montanus*, Hickman.

Plate XVI., Figs. 1 and 2.

In the Proceedings of this Society for the year 1926 I gave a brief description of the nest of *Hexathele montanus* (2) from the Western Tiers. Since then I have examined a large number of these nests on the Cradle Mountain and am able to make the following additional observations. The spider appears to be the most common Avicularid on the Cradle Mountain and is very plentiful in the vicinity of Daisy Dell. It makes its nest under the bark of trees, in rotten logs, in stumps and sometimes under stones on the ground. The nest is made by lining some natural cavity with silk and in most cases the opening of the nest is expanded into a thick silken network. (See Plate XVI., Fig. 1.)

During the daytime the entrance is closed with a few threads of silk woven across the opening. One nest which I examined contained a pillow-shaped egg sac hung from the top of the silk-lined cavity. (See Plate XVI., Fig. 2.)

Family DYSDERIDÆ.

Sub-Family SEGESTRIINÆ.

Genus *Ariadna*, Aud. in Sav.

Ariadna major, sp. nov.

The description of the female is as follows:—

Measurements in millimetres.

Total Length 16.0

Length of Cephalothorax	8.0
Breadth of Cephalothorax	5.0
Length of Abdomen	9.5
Breadth of Abdomen	6.0

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	2.5	5.0	6.0	4.0	17.5
2	2.2	5.0	5.7	4.5	17.4
3	1.7	4.5	4.5	4.2	14.9
4	1.7	5.3	5.3	4.5	16.8
				Tarsus	
Palpi	0.8	3.0	2.0	1.6	7.4

Cephalothorax: Long, slightly rounded at the sides, high in front, strongly arched from side to side, cephalic part rounded, the whole surface uniformly black in colour and lightly clothed with fine hairs which are directed forward.

Clypeus: Narrow, the distance from the front lateral eyes to the base of the falces being equal to four ninths of the distance which separates these eyes.

Eyes: Six in number, oval in shape and equal in size; occupy a transverse area about one third of the breadth of the front of the cephalothorax. The median eyes are almost contiguous with each other and separated from the rear laterals by a little more than twice their individual short diameter. Viewed from above the medians appear to form a straight line with the rear laterals but viewed from the front the line is seen to be slightly procurved. The front and rear laterals of each side occupy a common prominence and are close together, but the rear eye is more to the side than the front eye. (See Text Fig. 2 C.)

Legs: Relative lengths 1, 2, 4, 3, the first two pairs are almost equal in length. All the legs are moderately strong, the first three pairs are directed forward, the rear pair backward. The femoral segment of leg 1 is strongly bowed, the corresponding segments of legs 2, 3, and 4 are slightly bowed. Legs 1 and 2 are dark brown in colour except the patellæ which are light brown. Legs 3 and 4 are a lighter brown in colour. On the inner side of the femur of leg 1 near the apex are two small spines, while the femora of legs 2 and 3 are armed with a single spine in a similar position. The femur of leg 4 has no spines. All the patellæ are devoid of spines. The tibial segment of leg 1 is armed on the underside with a double series of powerful spines, that of leg 2 has a row of eight spines on the outer margin of the under surface

and three spines on the inner margin, that of leg 3 has a row of three spines underneath and two spines on the inner side, and that of leg 4 has a row of three slender spines on the under surface. All the metatarsi are armed with spines, those on the under surface of the metatarsi of the front three pairs of legs being particularly strong and numerous. The tarsal segments are very short and devoid of spines. The superior tarsal claws are stout and provided with a row of eight or nine teeth, the inferior claw is strong and bare. All the legs are clothed with long hairs but bare spaces are to be seen on the upper surface of the patellæ. The coxæ of the third pair of legs are separated from those of the fourth pair by a space equal to the diameter of the latter.

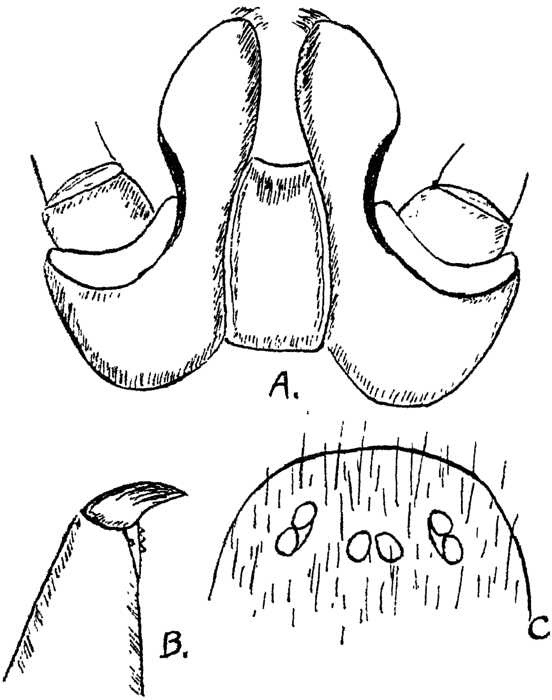


Fig. 2. *Ariadna major* (*sp. nov.*), ♀.

A. Maxillæ and labium. B. Falx. C. Eyes viewed from above.

Palpi: Short, dark brown, clothed with long black hairs. The inner side of the tarsal and tibial segments armed with numerous short thick spines. The tarsal claw slightly curved and not pectinated.

Falces: Conical, black, strong, sloping slightly forward. Fang very short, stout, and strong. Three minute teeth on the outer margin and one very small tooth on the inner margin of the furrow. (See Text Fig. 2. B.)

Maxillæ: Rounded at the base, broadest a little above, curved deeply inwards so that they become narrowest opposite the point where the palpi are attached; they then curve outwards again and end in a narrow rounded tip. Their colour is brown except at the tips where it is white. (See Text Fig. 2. A.)

Labium: Nearly twice as long as broad, arched, slightly narrowed in front and flat round the margin; indented in front; dark brown with a white tip; clothed with a few long black hairs.

Sternum: About twice as long as it is broad, shield shape, narrow anteriorly, convex from side to side. There are slight depressions on each side opposite the spaces between the coxæ. Dark brown in colour, shining, and clothed with a few black hairs.

Abdomen: Long oval in shape, almost black in colour, no pattern in mature specimens, clothed with fine black hairs. The under surface is marked with fine transverse lines of a lighter colour, which make it appear wrinkled. Lung covers are yellow. The two pairs of stigmata are quite distinct. The anterior pair are in line with the genital aperture; the rear pair are close behind them and a little nearer the middle line. Spinnerets are short and conical.

Locality: The summit of Mt. Hobbs (2,400 ft.), Woodsdale. 13th May, 1928.

Field Notes: This spider was found guarding its egg sac in a silken tubular nest attached to the under surface of a stone. The egg sac was spherical and contained a large number of eggs.

Ariadna muscosa, sp. nov.

The description of the male is as follows:—

Measurements in millimetres.

Total length	5.2
Length of Cephalothorax	2.4
Breadth of Cephalothorax	1.6
Length of Abdomen	2.8
Breadth of Abdomen	1.8

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	0.75	2.32	2.40	2.25	7.72
2	0.71	2.25	2.45	2.21	7.62
3	0.53	1.75	1.82	1.75	5.85
4	0.71	2.00	2.13	1.85	6.69
				Tarsus	
Palpi	0.35	0.87	0.96	0.42	2.60

Cephalothorax: Long, slightly rounded on the sides, arched, narrow in front; cephalic part dark brown gradually shading into a lighter brown on the thoracic part; lightly clothed with a few fine black hairs.

Clypeus: Narrow, the distance from the base of the falces to the front lateral eyes being equal to half the distance between these eyes; slopes forward and is clothed with a few short black bristles.

Eyes: Six in number, arranged in a fairly close group, oval in shape, about equal in size and mounted on black rims. The two median eyes are contiguous with each other and when viewed from above appear to form a slightly recurved row with the rear laterals from which they are separated by a space equal to half their own individual long diameter. The front laterals are in contact with the rear laterals and are separated from each other by a space equal to three times the long diameter of a median eye. When viewed from above the front laterals are seen to project over the clypeus. (See Text Fig. 3 C.)

Legs: Relative lengths 1, 2, 4, 3. The three front pairs are directed forward, the fourth pair backward; light brown in colour. The femoral segments of the first pair of legs are bowed; they have no spines on the upper side but are furnished with two small spines on the inner side near the apex. The corresponding segments of legs 2 and 3 have two spines on the upper side and one near the apex on the inner side. Legs 4 have three spines on the upper side of the femoral segment. All the tibial and metatarsal segments are armed with spines but the tarsal segments are devoid of spines. The legs are lightly clothed with long hairs. The superior tarsal claws are armed with a row of seven or eight teeth, the inferior claw is small and bare.

Palpi: Short, light brown, clothed with a few short hairs. Bulb is simple and more or less spheroidal. It is provided with a long style which ends in a fine tip curved back like a hook. (See Text Fig. 3 A.)

Falces: Dark brown, 2.0 mm. long, conical, sloping forward and clothed with coarse bristles. Fang short and slightly curved. The outer margin of falx sheath is armed with a row of three minute teeth and the inner margin with one tooth.

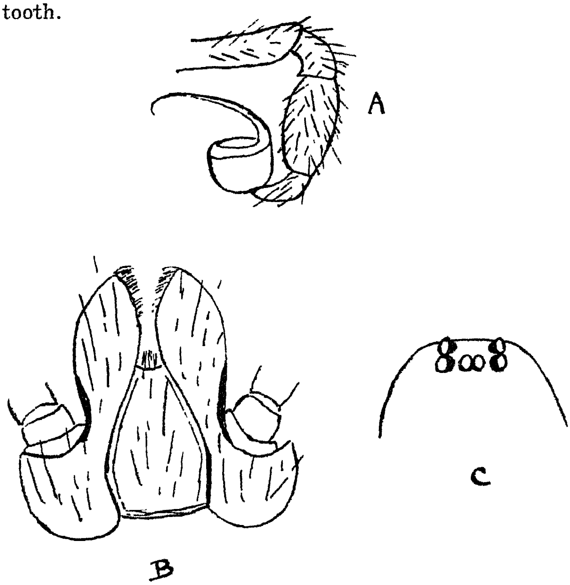


Fig. 3. *Ariadna muscosa* (*sp. nov.*), ♂.
A. Right palpus viewed from outer side. B. Maxillæ and labium.
C. Eyes viewed from above.

Maxillæ: Long, narrow, and leaf-like, light brown in colour except the tips which are white, clothed with a few long hairs. (See Text Fig. 3 B.)

Labium: About one and a half times as long as its greatest breadth and two thirds the length of the maxillæ, dark brown, strongly narrowed in front, broad in rear, arched, margin slightly reflexed, indented in front, clothed with a few long black hairs. (See Text Fig. 3 B.)

Sternum: Ovate in shape with the front truncated, surface strongly convex, light brown, clothed with a few black hairs.

Abdomen: Ovate, dark brown, marked with six transverse bars of light brown on the rear half of the dorsal surface. Under surface pale yellowish brown with a median longitudinal patch of dark brown. *Spinnerets* short and conical.

The description of the female is as follows:—

Measumements in millimetres.

Total length	7.6
Length of Cephalothorax	2.6
Breadth of Cephalothorax	1.8
Length of Abdomen	5.1
Breadth of Abdomen	2.6

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	0.7	2.3	2.3	1.8	7.1
2	0.6	2.1	2.3	1.8	6.8
3	0.5	1.8	1.5	1.5	5.3
4	0.6	2.2	2.1	1.8	6.7
				Tarsus	
Palpi	0.2	1.0	0.8	0.7	2.7

The female as usual is a little larger than the male, but resembles it in general appearance. The cephalothorax is of a dark brown colour and clothed with fine hairs which are thinly distributed over the surface. They appear to be arranged in longitudinal parallel rows especially on the middle of the dorsal surface. The six eyes are arranged as in the male. The legs are light brown in colour and clothed with fine hairs. The tarsi are short and without spines. The superior tarsal claws of leg 1 have a row of nine or ten long teeth. The inferior claw is small and has one tooth near the base. The metatarsi are all armed with spines, and in the case of legs 1 and 2 the armature is very strong. Tibiæ 1 and 2 are also strongly armed with spines, and the corresponding segments of legs 3 and 4 are lightly armed with one or two spines. The femoral segments have no spines above, but are armed on the inner side as in the male. The palpi are dark brown and furnished with numerous strong spines on the inner side of the tarsal and tibial segments. The falces are long and strong, project forwards, and are provided with a short curved fang. The outer margin of the falx sheath is armed with three small teeth and the inner margin with one. The maxillæ, labium, and sternum have the same features as in the male, but the labium is not quite so narrow in front. The abdomen is darker than in the male and the transverse bars are not so distinct.

Locality: The Punch Bowl Reserve, Launceston. 17th May, 1928.

Field Notes: This spider makes a long tubular nest of silk among the moss and lichens covering the surface of rocks and stones in damp shady situations.

Family MIMETIDÆ.

Genus *Mimetus*, Hentz.

This family of spiders is a very small one and includes only about thirty-five species from the whole cf the world. The first recorded specimen from Australia was found in New South Wales and described by W. J. Rainbow in 1904 under the name of *Mimetus maculosus* (3). I can find no further reference to Mimetids from Australia until 1924, when Dr. R. Pulleine (4) recorded a specimen, which he collected from the web of *Singotypa wagneri* in the vicinity of Marion Bay, Tasmania.

The following account deals with three species collected near Launceston. Two belong to the genus *Mimetus*, one to *Ero*.

Mimetus audax, sp. nov.

Plate XVII.

The description of the female is as follows:—

Measurements in millimetres.

Total Length	5.40
Length of Cephalothorax	2.32
Breadth of Cephalothorax	1.62
Length of Abdomen	3.21
Breadth of Abdomen	2.71

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	0.60	2.53	2.85	2.80	8.78
2	0.47	2.06	2.12	2.15	6.80
3	0.44	1.68	1.64	1.64	5.40
4	0.53	2.37	2.37	2.23	7.50
				Tarsus	
Palpi	0.10	0.34	0.50	0.63	1.57

Cephalothorax: Obovate, arched, narrow in front, dull yellow with a median longitudinal patch of brown and a few spots of the same colour on the sides.

Pars Cephalica: Mottled with dark brown spots and furnished with a few short bristles which point towards the front, the anterior margin is truncate and slightly overhangs the clypeus. Cephalic groove distinct.

Pars Thoracica: Broad, smooth, arched, furnished with a few short bristles on dark brown patches, medium depression deep.

Clypeus: Narrow, brown, provided with two or three bristles.

Eyes: Eight in number; the anterior median eyes are the largest of the group. They are mounted on a rounded eminence which projects over the clypeus, and are separated from each other by a space which is equal to one and a third times their individual diameter. The rear medians are pearly white, nearly as large as the front medians and much closer together, being separated by a space scarcely equal to their individual diameter. The front medians are separated from the rear medians by a space equal to the diameter of a front median eye. The laterals are mounted on small tubercles and are contiguous; the rear laterals are separated from the rear medians by a space equal to that which separates the rear medians from the front medians, and the latter are separated from the front laterals by slightly less than this distance.

Legs: Relative lengths 1, 4, 2, 3; yellowish, marked with brown spots and bands, lightly clothed with bristle-like hairs. All the legs are furnished with spines. Near the proximal end on the outer side of femur (1) is a straight longitudinal row of minute dentiform spines, which seem to engage a similar row of spines on the inner side of femur (2). They may serve a stridulating function since their size and position preclude their use as a means of defence. The distal half of the tibiæ and the whole length of the metatarsi of the first and second pairs of legs are furnished on the inner side with the armature of curved spines which is characteristic of the genus. The number and arrangement of the spines are shown in Text Fig. 4 A and B. The superior tarsal claws are large and well curved. They are provided with four or five teeth. The inferior claw is also large and furnished with one tooth. (See Text. Fig. 4 D.)

Palpi: Yellow with a brown band on femoral, tibial, and tarsal segments respectively; clothed with a few short hairs and bristles. The single tarsal claw is provided with two teeth and is not very strongly curved. (See Text Fig. 4 C.)

Falces: Length 1.2 mm., dark brown, shining fang short but well curved; furrow armed with about nine long spine-like teeth. (See Text Fig. 4 E.)

Maxillæ: Moderately long, brown, tips white; provided with a grey scopula, and clothed with a few long black bristles.

Labium: Dark brown with a white tip, short, arched, rounded at the tip and very broad at the base.

Sternum: Heart shape, arched, brown except the margin and a small patch in rear of the labium which are yellow; clothed with a few black bristles.

Abdomen: Obovate, broad and rounded in front, narrow in rear. The posterior half of the dorsal surface is marked with a triangular patch of a dirty cream colour. The apex of the triangle reaches to the spinnerets, while the base extends from side to side across the centre of the back and on each side ends in a slight hump. The sides of the triangle are undulating and the base is also irregular. The anterior half of the dorsal surface is marked with dark brown spots on each side of a median longitudinal brown patch. The sides of the abdomen are dark brown and the under surface spotted with brown. The whole surface of the abdomen is clothed with short thick curved bristles.

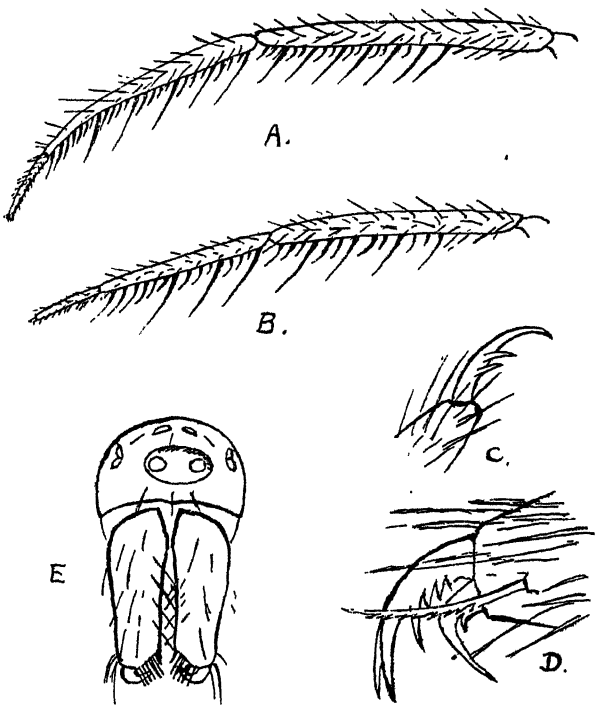


Fig. 4. *Mimetus audax (sp. nov)*, ♀.

A. Tibia and metatarsus of leg (1). B. Tibia and metatarsus of leg (2). C. Tarsal claw of palpus. D. Tarsal claw of leg (4). E. Falces and eyes; front view.

Epigynum: Mounted on a dark brown tubercle, which is clothed with short hairs. It has the form shown in Text Fig. 5.

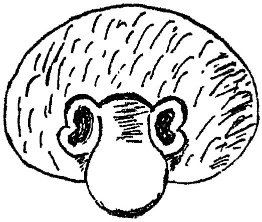


Fig. 5. *Mimetus audax* (*sp. nov.*). Epigynum.

Spinnerets: The fore pair large, dark brown, and conical; the middle and hind pairs much smaller and pale yellow; all are clothed with fine hairs.

Locality: Brougham Street, Launceston. 25th April, 1928.

Field Notes: Only three specimens were found. These were taken from the webs of *Latrodectus hasseltii*, Thor. In one case the rightful owner of the web had been either ousted or devoured; in the other cases both owner and intruder were living together in the same web. The young spiderlings of *Latrodectus hasseltii* were numerous in the webs and probably *Mimetus audax* fed chiefly on these. To enter the nest of the dreaded *Latrodectus* and feed on its young is an exploit which merits the specific name "*audax*."

Mimetus auriculatus, sp. nov.

The description of the male is as follows:—

Measurements in millimetres.

Total length	2.6
Length of Cephalothorax	1.3
Breadth of Cephalothorax	1.1
Length of Abdomen	1.3
Breadth of Abdomen	1.1

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	0.4	3.2	3.8	4.0	11.4
2	0.3	2.1	2.3	2.4	7.1
3	0.2	1.3	1.2	1.4	4.1
4	0.3	1.8	1.6	1.7	5.4
				Tarsus	
Palpi	0.1	0.9	0.6	0.4	2.0

Cephalothorax: Arched, pyriform, narrow in front; yellow in colour with faint brown markings at the sides.

Pars Cephalica: Yellow with faint brown markings, sloping gently forward, provided with a median row of four stiff bristles and also a row of five similar bristles on each side parallel with and near to the cervical groove.

Pars Thoracica: Broad, smooth, arched, provided with a few short hairs; medium depression well marked.

Clypeus: Narrow, the space from the front median eyes to the margin being about equal to the diameter of one of a front median eye; yellow in colour, furnished with two or three bristles.

Eyes: Eight in number, mounted on beautiful golden tubercles which have quite a metallic lustre and suggested the specific name "*aurioculatus*." The front median eyes occupy a common tubercle and project slightly over the anterior margin. They are slightly larger than the other eyes and are separated from each other by a space equal to once their individual diameter and from the front laterals by half this distance. The front and rear laterals of each side occupy a common tubercle and are contiguous. The rear medians are pearly white and separated by a space which is slightly less than that between the front medians. The rear laterals are separated from the rear medians by a space equal to that which separates the latter from the front medians.

Legs: Long, slender, and tapering; yellow in colour marked with brown bands especially at the joints. All the legs are furnished with long slender spines and bristles. On the outer side of the femur of leg (1) and on the inner side of the femur of leg (2) near the base is a longitudinal row of minute dentiform spines as noted in the preceding species. The characteristic armature on the metatarsi and tibiæ of the first two pairs of legs is more pronounced in the female than in the male. In the latter the intermediate spines, arranged in ascending order of size between the larger ones, are slender and not strongly curved at the tips. (See Text Fig. 6 A.) It is therefore difficult to distinguish them among the other similar spines on the legs. In the female, however, the characteristic structure is well developed.

Palpi: Pale yellow, lightly clothed with short hair. A strong bristle projects near the apex of the femur, two on the patella and several thinner ones on the tibia. The genital bulb is complex; its chief features are shown in Text Fig. 6 B.

The tarsal segment is sparingly clothed with fine short hairs, and along its outer edge is a conspicuous row of four thick bristles which do not taper to a point.

Falces: Yellow, long, cylindrical, clothed with a few short bristles. Fang short, but well curved. Furrow armed with the usual long spine-like teeth. (See Text Fig. 6 C.)

Maxillæ: Long, yellow, clothed with a few short hairs, and furnished with a short dark coloured scopula at the inner angle.

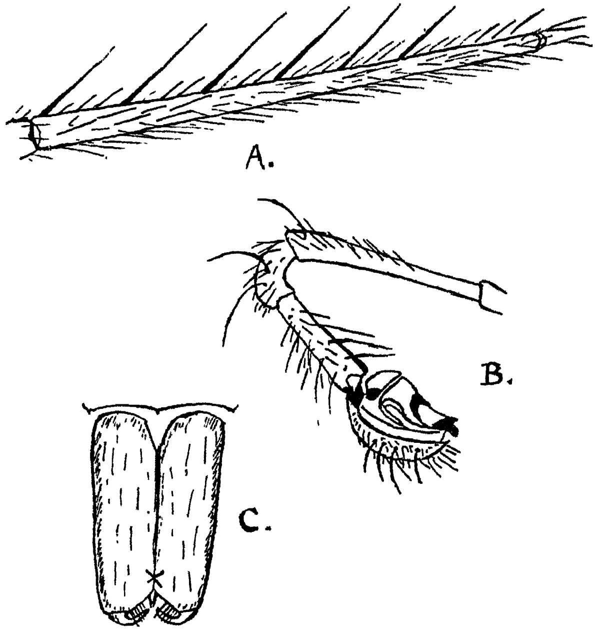


Fig. 6. *Mimetus aurioculatus* (*sp. nov.*), ♂

A. Metatarsus of leg (1). B. Left palpus viewed from outer side C. Falces viewed from in front.

Labium: About half the length of the maxillæ, moderately broad, arched, yellow, tip well rounded, clothed with a few short hairs.

Sternum: Yellow, cordate, arched from side to side and from front to rear, furnished with a few short hairs.

Abdomen: Broadly ovate, clothed with short curved bristles and marked with yellow, red, brown, and silver spots, the yellow predominating.

Spinnerets: Brownish yellow, clothed with fine hairs; the fore pair largest.

The description of the female is as follows:—

Measurements in millimetres.

Total Length	3.3
Length of Cephalothorax	1.5
Breadth of Cephalothorax	1.1
Length of Abdomen	1.8
Breadth of Abdomen	1.9

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	0.40	3.00	3.40	3.40	10.20
2	0.40	2.00	2.30	2.40	7.10
3	0.30	1.40	1.30	1.50	4.50
4	0.35	1.90	1.70	1.70	5.65
				Tarsus	
Palpi	0.16	0.44	0.55	0.66	1.81

The female is a little larger than the male but closely resembles it in general appearance, colouration, and markings. The abdomen, however, is broader than long and has the shape shown in Text Fig. 7 A. The eyes are mounted on golden tubercles as in the male. All the legs are armed with spines and bristles. The armature on the metatarsal and tibial segments of the first two pairs of legs has the arrangement characteristic of the genus. (See Text Fig. 7 C.)

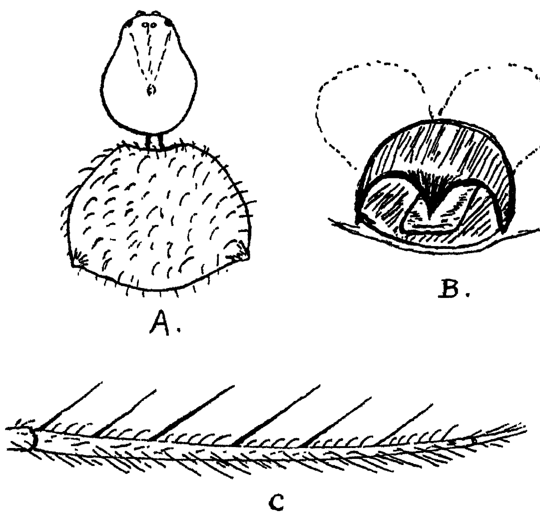


Fig. 7. *Mimetus aurioculatus* (*sp. nov.*), ♀.

A. Cephalothorax and abdomen. B Epigynum. C. Metatarsus of leg (1).

Epigynum: Mounted on a slightly elevated brownish tubercle; the opening faces to the rear and just inside is a flat rectangular plate. The ventral margin of the opening is produced into a point directed towards the rear. (See Text Fig. 7 B.) Two brown patches extend on each side and in front of the epigynum.

Locality: The Punch Bowl, Launceston. 5th May, 1928.

Field Notes: One male and two female specimens, which were mature, together with several immature specimens were collected. They were taken from shrubs of common gorse (*Ulex europeus*) near a creek, which runs through the reserve.

Genus *Ero*, C. Koch.

This genus is closely allied to *Mimetus*. In the latter, however, the front pair of legs are much longer than the rear pair, whilst in *Ero* the front and rear pairs are about equal in length. The clypeus in *Ero* is much wider than it is in *Mimetus*, and in the definition of the genus given by Simon (5) it is said to be wider than the ocular area. The Tasmanian spider which I propose to call *Ero tasmaniensis* agrees very closely both in form and habits with other species of this genus, but its clypeus is not as wide as the ocular area, and in this respect it resembles *Mimetus*. I do not feel justified in erecting a new genus based on this distinction alone, and therefore place the spider in the genus *Ero*.

Ero tasmaniensis, sp. nov.

The description of the male is as follows:—

Measurements in millimetres.

Total Length	2.9
Length of Cephalothorax	1.7
Breadth of Cephalothorax	1.2
Length of Abdomen	1.7
Breadth of Abdomen	1.1

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	0.5	1.8	2.2	2.5	7.0
2	0.4	1.4	1.6	1.8	5.2
3	0.3	1.3	1.3	1.5	4.4
4	0.4	1.8	2.2	2.5	6.9
				Tarsus	
Palpi	0.2	0.8	0.5	0.6	2.1

Cephalothorax: Pyriform, strongly narrowed in front, arched, broadest between the second pair of legs.

Pars Cephalica: Brown, sloping gently forward, clothed with a few black bristles.

Pars Thoracica: Light brown shading into a darker brown on the margin; smooth with only a very few short hairs scattered over the surface. The medium depression is long and deep, it is situated at a distance from the front of the cephalothorax equal to three-quarters of the length of the cephalothorax.

Clypeus: Inclined slightly backwards; wide, the distance from the front median eyes to the base of the falces being equal to half the breadth of the ocular area and about three times the diameter of a front median eye; a few short bristles below the eyes.

Eyes: Eight in number. The front row is shorter than the rear row. The front medians occupy a black tubercle and project slightly over the clypeus. They are separated from each other by a space equal to slightly less than once their individual diameter, from the rear medians by the same distance and from the front laterals by half this distance. The rear medians are separated from each other by a space equal to slightly less than that which separates the front medians, and from their lateral neighbours by one and three-quarter times this distance. The front and rear laterals are contiguous and mounted on a black tubercle. The rear medians are pearly white, not quite circular in shape and mounted on black rims.

Legs: Relative lengths 1, 4, 2, 3, the front pair being practically equal in length to the rear pair; concolorous with the cephalothorax and marked with bands of a darker shade of brown. The tarsal segments are devoid of spines but the metatarsal, tibial, and femoral segments are all armed with spines. As in the preceding species of *Mimetus* there is a longitudinal row of minute spines on the outer side of the basal half of femur 1 and another row in a similar position on the inner side of femur 2. The armature on the metatarsal and tibial segments of the first two pairs of legs consists of the usual arrangement of short curved spines placed between long straight ones. (See Text Fig. 8 D.) The superior tarsal claws are not strongly curved. Those of leg 4 are armed with four teeth. The inferior claw is large, hook-shaped, and armed with a single tooth. (See Text Fig. 8 B.)

Palpi: Yellowish brown, lightly clothed with short hairs; a prominent bristle projects from the patella; the tarsal segment is large and has near its base a strong curved apophysis with a smaller one next to it. The genital bulb is large, shining, brown, and complicated. Its chief features are shown in Text Fig. 8 C.

Falces: Brown, moderately long, conical, clothed with a few bristles and short hairs. Fang short, strong, and well curved. Sheath armed with seven long spine-like teeth on the outer margin.

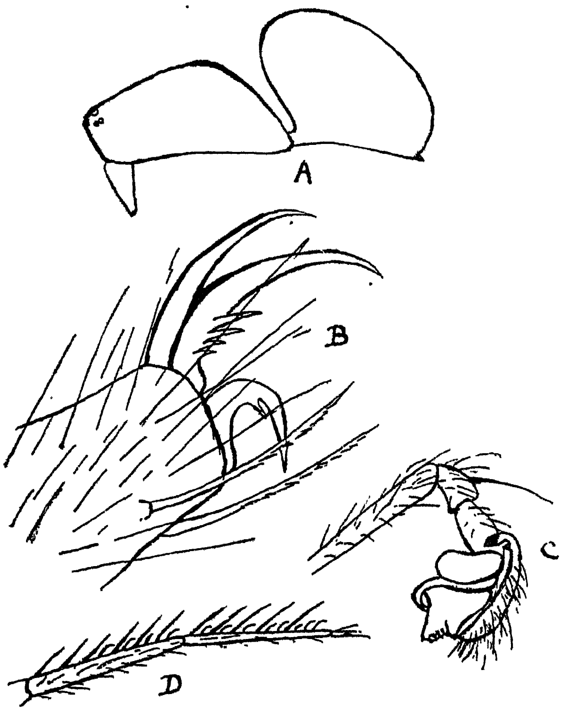
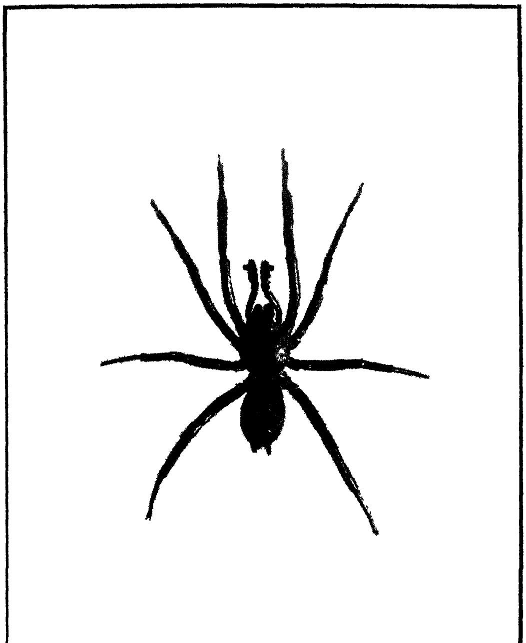


Fig. 8. *Ero tasmaniensis* (*sp. nov.*), ♂.

A. Cephalothorax and abdomen in profile. B. Tarsal claws of leg (4). C. Right palpus from outer side. D. Tibia and metatarsus of leg (1).

Maxillæ: Yellow, slightly converging, clothed with a few black bristles and furnished with a grey scopula along the inner margin.

Labium: Yellow, triangular with a broad base and well-rounded tip, about half the length of the maxillæ, and clothed with a few short hairs.



Migas nitens, Hickman, ♂.

Fig. 1. *Hexathele montanus*, Hickman.
Entrance to nest showing network of silk.

Fig. 2. *Hexathele montanus*, Hickman.
Nest in side of a log, and showing pillow-shaped egg sac.

Sternum: Ovate, convex, curved in front round the base of the labium, yellow in colour, clothed with a few short bristles which point towards the centre, ends in a blunt point between the coxæ of the fourth pair of legs. This point carries a pair of conspicuous curved bristles.

Abdomen: Ovate, overhangs the rear of the cephalothorax, brownish in colour with silver white flecks and markings, a longitudinal white patch on the rear half. The under surface is pale yellow. Coarse erect bristles are distributed over the whole surface.

Spinnerets: Pale yellow, fore pair largest.

The following is the description of the female:—

Measurements in millimetres.

Total Length	4.1
Length of Cephalothorax	1.5
Breadth of Cephalothorax	1.1
Length of Abdomen	2.6
Breadth of Abdomen	1.9

Leg	Coxa	Trochanter and Femur	Patella and Tibia	Metatarsus and Tarsus	Total
1	0.4	1.5	1.6	1.5	5.0
2	0.4	1.2	1.4	1.4	4.4
3	0.3	1.1	1.1	1.2	3.7
4	0.4	1.6	1.6	1.8	5.4
				Tarsus	
Palpi	0.1	0.4	0.4	0.5	1.4

Cephalothorax and *abdomen* have the same colouration and clothing as in the male. The legs are shorter than those of the male and the fourth pair are longer than the first pair. All the legs are clothed with stiff bristles and hairs, but are not armed with as many spines as in the male. The femoral and tarsal segments are without spines; the tibial and metatarsal segments of legs 3 and 4 each possesses a single spine, whilst the corresponding segments of legs 1 and 2 have the characteristic armature of long spines with short curved spines between them. (See Text Fig. 9 B.) The palpi are yellow, moderately long, and end in a single claw which has three or four teeth. The falces, maxillæ, labium, and sternum are as in the male.

Epigynum: Brown, somewhat raised, and has the form shown in Text Fig. 9 A.

Locality: Trevallyn, Launceston.

Field Notes: Three male specimens were collected in April, 1928. They were found resting on the under surface of stones in a rather damp situation. A single female specimen was found at the same locality in August of the same year and was also taken from the under surface of a stone.

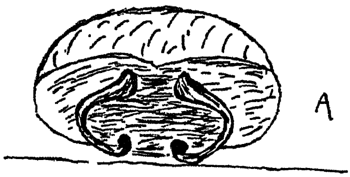


Fig. 9. *Ero tasmaniensis* (*sp. nov.*), ♀.

A. Epigynum. B. Tibia and metatarsus of leg (1).

Types: The type specimens of spiders described in this paper will be placed in the Queen Victoria Museum, Launceston.

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(3) W. J. Rainbow, Rec. Aust. Museum, Vol. V., No. 5, 1904, p. 330.

(4) R. Pulleine, Tas. Field Nats.' Club, Easter Camp, 1924, p. 16.

(5) E. Simon, "Hist. Nat. des Araignées," T.I., p. 946.

EXPLANATION OF PLATES.

PLATE XV.

Migas nitens ♂.

PLATE XVI.

Fig. 1.—*Hexathele montanus.* Entrance to nest showing network of silk.

Fig. 2.—*H. montanus.* Nest in the side of a log and showing pillow-shaped egg sac.

PLATE XVII.

Mimetus audax, sp. nov. ♀.

THE INHERITANCE OF SEX IN AN ABNORMAL (CARPELLODIC) WALL-FLOWER.

By

ALEXANDER NELSON, PH.D., B.SC.

Plates XVIII.-XX.

(Read 12th November, 1928.)

In wall-flower (*Cheiranthus cheiri*, L.) a curious floral abnormality has long been known. The plant is quite normal until it blooms. In the flower, however, while the sepals are normal the petals are reduced to narrow strips equal in length to the sepals or slightly shorter. The stamens are as usual six in number, but adhere together, forming a closed ring round about the normal ovary. Sometimes in individual rings the line of adherence between the stamens is more or less lacking, and a split takes place and the ring is not complete. The lines of adherence are what might be regarded as the margins of the leaves which normally grow together to form the cavity within which the pollen is produced. The total effect of this form of growth is that a ring is formed with the sporogenous tissue facing into the space between the ring of adherent stamens and the normal ovary. This sporogenous tissue produces not pollen but ovules which lie within the space between the stamen ring and true ovary. The stamens are thus spoken of as carpellodic, as they produce ovules, and each has a functioning stigmatic surface at its distal end. On pollen being applied to the stigmatic area of the carpellodic stamen the ovules mature into viable seed. The flowers of any plant are all affected; one never finds normal and abnormal flowers on the same plant. We may regard the abnormal as completely female as distinguished from the normal hermaphrodite.

De Candolle (2) describes the abnormal as a distinct variety under the name *Cheiranthus cheiri gynanthus*. How far this is valid may be questioned, as the abnormal can only set seed when pollinated from the normal hermaphrodite, and is, therefore, not self perpetuating.

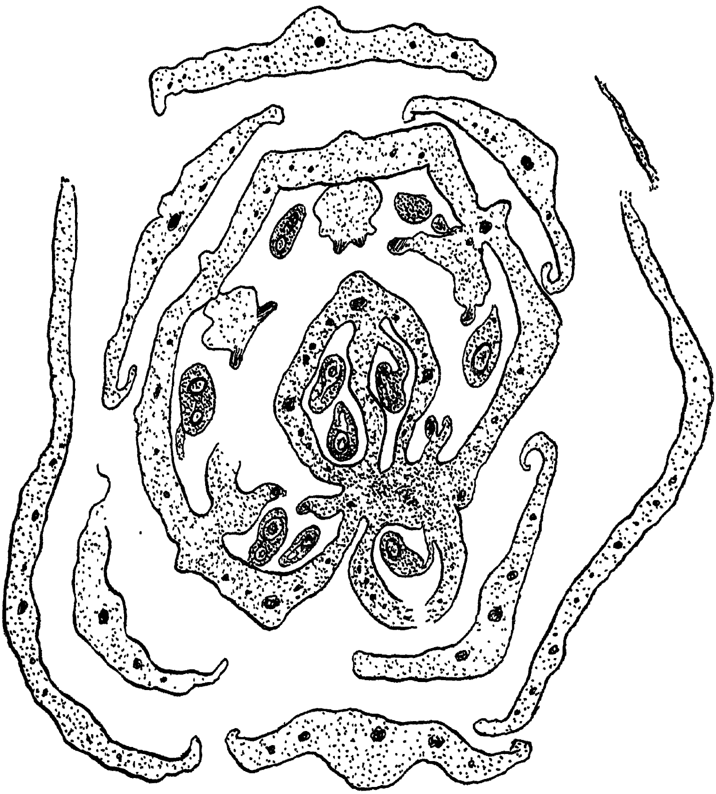
A number of somewhat similar aberrations are known in other species. The Opium Poppy (*Papaver somniferum*) sometimes shows metamorphosed stamens tending more or less completely towards the carpellodic type, but rarely is the whole andrœcium affected, and never all the flowers of one plant completely. Weatherwax (5) has noted a case of carpellody in Maize (*Zea mays*) resulting from the metamorphosis of the rudimentary stamens of the pistillate flowers. The metamorphosis in this case seems to depend for full development on the fertilisation of the adjacent ovary. The same author (6) finds that though the style and stigma of the carpel-like stamens are similar to those of the normal organ, there is no true ovarian cavity and no ovules are formed. The cases of maize and wall-flower described above are interesting in comparison, as in the latter functioning ovules are produced and the change is from functioning male organ to functioning female organ rather than from obsolescent male organ to non-functioning female organ. A number of cases of suppression of one or other of the sexes of normally hermaphrodite flowered plants are known. The flowers of the Sweet Pea (*Lathyrus odoratus*, L.) are normally hermaphrodite, but occasionally plants are found in which all the stamens have aborted. Bateson, Saunders & Punnett (1) investigated this case, and have shown that the condition is definitely hereditable and passed from generation to generation on a simple Mendelian scheme, the abnormal being recessive to the normal. There are a number of other cases in the literature more or less clear cut where suppression or abortion of the stamens is definitely inherited.

De Vries (4) discussing the carpellodic wall-flower surmised that the condition was hereditable, but offered no evidence. A number of writers, for example Schaffner (3), have stated that sex reversal is primarily dependent on physiological states, and these are subject to change and reversal through ecological factors.

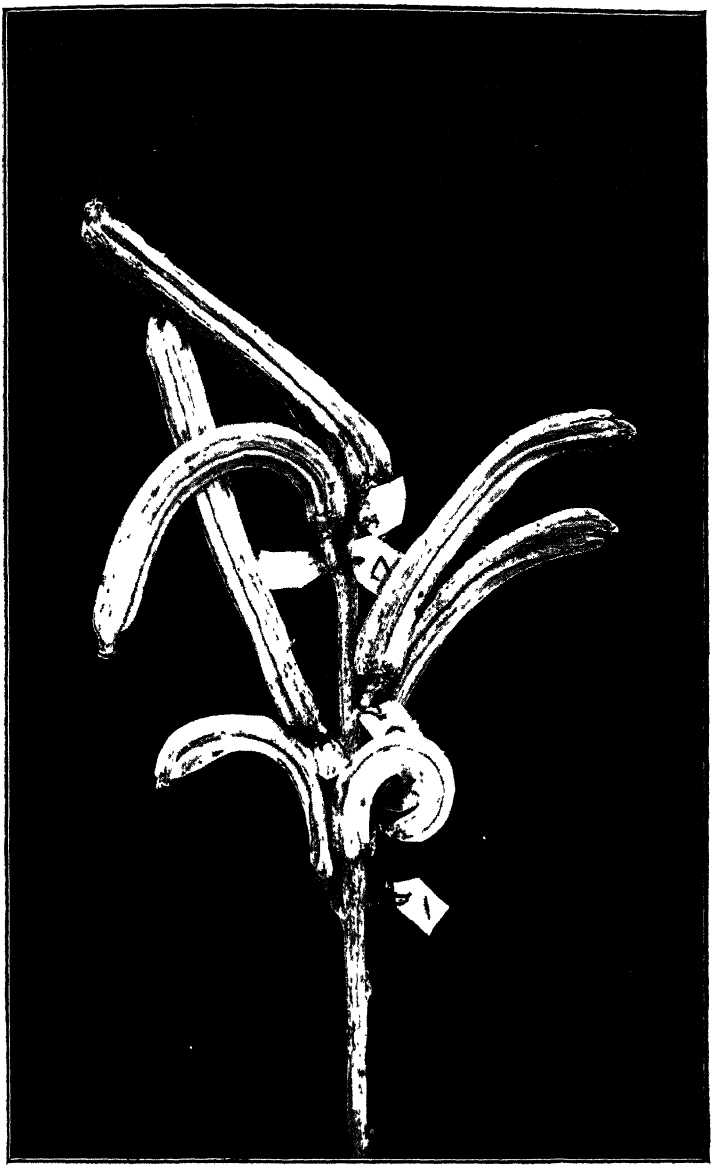
The present writer discovered growing in a crop of wall-flower in East Scotland one plant which was of the abnormal carpellodic form and pollinated it with the normal hermaphrodite. (This hermaphrodite, self-pollinated, and the seed sown, produced only normals, so it may be regarded as being homozygous.)

The seed from the abnormal (so pollinated) when saved produced an F1 generation, all normal. Close examina-

Carpellodic Wall-Flower in full bloom.



Cross section of flower showing stamen ring "ovary" around normal ovary.



Fruits, some showing developmental curvature due to selective pollination on the stamen ovaries.

tion of the flowers of this generation showed no trace of abnormality except that there seemed to be rather less pollen produced by the stamens. The F1 self-fertilised produced an F2 in which normals and abnormals occurred in the ratio of 3 : 1. The actual figures were 266 normal and 85 abnormal, which agrees very closely with expectation, though the figures are somewhat small. This F2 was grown partly in West Scotland and partly in S.E. England. Since then an F3 generation has been grown in Tasmania and the abnormal appeared as expected.

In this case it would seem clear that the sex reversal is not due to environment, but to a simple factor pair inherited on a simple Mendelian basis, the abnormal form being recessive.

To throw some light on the relationship of the various parts of the stamen ring the stigmatic area of various members was cut off and the remaining members pollinated. The pollen had its usual developmental effect on the ovarian tissue only on the portions which carried stigmatic tissue. Those portions originated from stamens whose stigma had been cut off did not develop. Development following on pollination was limited to the metamorphosed stamen significantly pollinated, and did not spread to unpollinated neighbours. Pollination of the true ovary had no effect on the "stamen ovary" and *vice versa*. The effect of differential development following on pollinating these different parts of the stamen ring caused bending and twisting of the composite fruit as is shown in Plate XX.

DESCRIPTION OF PLATES.

Plate XVIII.

Carpellodic Wall-Flower in full bloom.

Plate XIX.

Cross section of flower showing stamen ring "ovary" around normal ovary.

Plate XX.

Fruits, some showing developmental curvature due to selective pollination on the stamen ovaries.

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4. De Vries, 1905. *Species and Varieties—Their Origin by Mutation*, Chicago.

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6. Weatherwax, 1925. Notes on Grasses II. *Proc. Indiana Acad.*, Sec. 34.

CHIPPED STONE TOOLS OF THE ABORIGINAL TRIBES EAST AND NORTH-EAST OF LAKE EYRE, SOUTH AUSTRALIA.

By

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Mulka Station, South Australia.

(Communicated by R. W. Legge.)

Plates XXI.-XXIX.

(Read 12th November, 1928.)

Most of the tools picked up by collectors are worn out and have been discarded—it was so easy to make a tool that directly one failed to work satisfactorily it was discarded and a fresh tool made, a supply of stone material always being kept handy for this purpose.

Usually the younger blacks got the rough material from the quarries—these were usually in some exposed place, so the young men, who had all of the wild animal's dread of being caught out in the open, would batter off as much stone as they could carry and would take it to where the old men waited, in some sheltered place, sometimes in a hollow in the sandhills, sometimes in the shelter of a timbered creek. Here the rough stone was chipped up, all pieces that were suitable for tools were then taken to the main camp to be worked up, the rough flakes that were of useless shape were left lying on the ground, and the cores were also discarded, unless, as sometimes happened, the cores were of suitable stone from which to chip small knives; they were then taken into the camp to be used up.

These cores have been variously described as upright scrapers, as planes, as skin scrapers, and Tartar's Cap scrapers, but they are really only discarded cores from which it was no longer possible to chip useful tools.

When the stones reached the camp the flakes were sorted out. Some were suitable for use as tuhlas (chisels), others were suitable for kalara (scrapers), other narrow flakes with a fairly high keel and about three-quarters of an inch

wide were set apart to be made into pirries. They were all put away into different string bags, and were then worked up as required. Sometimes one man would specialise on one tool and would put in all of his time in making that one tool. As they were made he would drop them in the sand about his poonga (hut) and would dig them up when any were required for barter (for food or weapons). Hundreds, of course, were lost, but they took so little time to make that the loss of a few in the sand did not matter very much.

We will suppose that the Aboriginal craftsman wants to make a pirrie—from his bag he selects a flake, about 2 inches long by from half an inch to three-quarters of an inch wide—the flake must have a pronounced keel on the one side. Having selected the flake, he warms up the pitch on the end of his koondi (stick or handle on which tools are mounted for use) and fixes the flake firmly in the pitch with the keel at right angles to the koondi. Now with a hammer stone (kool-kee) he chips away the edge, striking from the flat side downwards towards the keel and round the blunt end of the flake. When the one side is flaked to his liking he warms the pitch and releases the flake and reverses it, by imbedding the side that he has just flaked in the pitch; he then chips this side in the same manner. It is then taken from the pitch and finally pointed up by pressure. For this he selects a worn-out scraper that has thickened up into a "bull-nose" through use; then, using a nether nardoo stone (umpa) for a table he puts the flat edge of the kalara (scraper) to the place on the pirrie that he wishes to press off and presses down-wards. This is a very delicate operation—if he tries to take too big a piece the pirrie will probably break, but if he is suc-cessful the finished pirrie is the result. He will then just throw it into the sand and start on another one.

These pirries were used for fine graving work and occasionally were used as a drill, for drilling holes in Inkitcha (bullroarer) and for drilling holes in mussel shells, which were used as spoons for eating the Munyeroo paste. When used as a drill the pirrie was mounted in a small stick, never more than five-eighths of an inch in diameter, the one end was split and the pirrie was put in the split with the point projecting. It was then firmly bound with fibre string and was ready for use. If a hole was wanted in a wooden implement or utensil the spot to be bored was first charred with the pointed end of a glowing firestick, the pirrie in its stick was then rotated between the two hands

until the stone point had drilled out all of the charred wood, the firestick was then used to further char the hole and drilled out again with the pirrie, and so on until the hole was through. When drilling mussel shells the pirrie point was just pressed to the place where the hole was wanted and rotated between the hands until it bored through.

For use as graving tools they were mounted in pitch, made from almost anything of a gummy nature—wattle gum, mindrie gum, spinifex gum, beefwood gum, to mention a few—on the end of a curved stick called a koondi (the name really means curved), and the decorative marks on the boomerang or pirrha (woman's digging bowl) were made by holding the koondi between the two hands, with the pirrie point towards the body, and then lightly gouging out the marks, always working with the point towards the body.

The name pirrie means anything fine; a crack in the ground that a young plant makes as it breaks the crust is pirrie, a scratch is pirrie, the finger nails are Murra pirrie, and the toenails are tidna pirrie.

Pirries were never used as spear points. They were for one thing of the wrong shape, keeled on one side and flat on the other, would give a spear a very erratic flight. For another thing they were too small. When mounted as a spear head is mounted there would be only about half an inch of the pirrie protruding from the gum, or if bound on with sinew there would be only a very small point exposed, and finally the stone-headed spear was not known in this country. The Aboriginals of this country had only the heavy lance made of one piece of wood, usually mulga (called pirran-burra). The mission boys brought into this country from Hermannsburg by the Kopperamanna mission, introduced a form of light throwing spear, which was named kutchie, but even this had a hardwood head, made from mulga, or burra burra, and a shaft of lignum, but it never became popular. It was nearly always used by some visitors from the Arunta or Urubunna tribes.

Another stone that was used as a graver was known as Mernie wadna (literally, stout broken), principally for putting grooves about an eighth of an inch wide from end to end of a pirrha (digging bowl). This tool had a very high-keeled back and was chipped in a semi-circle at the back. The result in appearance was like a section of an orange, and if four of these were placed together they would make a complete ball—of course, they varied a lot,

some were longer than others and the points were more drawn out—in length they ranged from about an inch and a half long by about half an inch wide across the back to two and a half inches long. They never appear to be wider than about half an inch.

I had heard of this stone, but could never get a specimen, and so did not know what to look for in the deserted camps.

In June of this year (1928) Mr. and Mrs. R. W. Legge of Tasmania were staying with me. Mrs. Legge picked up several of these stones and submitted them to me for classification. They were of a type unknown to me, and I advised her that they were badly flaked worn-out tuhlas. Mrs. Legge, however, persisted in collecting a few and brought them in. That night we compared them and were forced to the conclusion that they were a new type.

The next morning I showed one to an old blackfellow, at least eighty years of age, and he immediately recognised them and told us the name and use of them. They seem to be very rare. I have been searching the old camps for this last month, but have only found one.

The old blackfellow has since shown me how they were made. A stone is selected that has a clean right-angle fracture, the points or ends are then chipped away with a coolkee until the semicircular back has been obtained. The points are the working parts so that very little interest is taken in the back, but in sharpening the ends to a point the back must of necessity be chipped back. A lot of skill is needed, as the whole thing very often shatters to pieces—I made two, under instructions from the old man, but three shattered to pieces just as I was feeling proud of them. The tool when finished was mounted on a koondi with mindrie or spinifex gum, and was used in the same way as the pirrie.

Kalara (literally, cutter or scraper) were mostly used as hand tools. They were made in the first place by using a flake as a smoothing tool to scrape off the roughness left after rough chopping with the tuhla. At first they were any keen-edged flake, but as they were used the edge flaked back and was chipped off if the stone was worth it, but when the edge or end had thickened up too much to cut effectively the stone was just dropped and another flake picked up. Kalara varied in shape, but a typical specimen was anything

from one and a half inches long by one inch wide up to four and five inches long by one and a half inches wide. These tools when found give one the impression that they have been chipped into shape before using, but really the symmetrical shape is only caused by attrition in use. Sometimes they were chipped back by striking on the edge with a koolkee, with the flat or cutting edge held uppermost in the hand—the resulting flakes made the so-called chipped backed knives. In *Savage Life in Central Australia*, page 90, I state that these tools were mounted in mindrie pitch and were used as gouges, but I find that the kalara merges into the tuhla, and what I then took to be kalara (scrapers) were really long tuhlas (chisels).

The tuhla was the principal tool used in weapon making, it was made from any stone that would flake right, that is with a thick back and a sharp cutting edge—an ideal shape is a semicircle with a bulb on the back at the base. A lot of care was shown in chipping and selecting these stones from the rough mudda (parent stone). I have seen a party of blacks with perhaps a hundred of these laid out for final selection, and after the whole lot had sat in judgment only about a dozen would be taken. Even after they were mounted on the koondi there would be a lot of fine chipping to get the ideal semicircular cutting edge, similar to a wood-turner's gouge. In use these were used with a chopping or adzing motion, the wood that was being worked either being stuck in the sand or clamped by both feet. As the tool became blunt in use the edge was flaked off with a koolkee until there was very little of the stone left. Some worn-out tuhlas that I have beside me are only about a quarter of an inch wide and two and a half inches across. These would be at least two inches from back to cutting edge before being put into use. Tuhla varied in size from about an inch, or even less, wide up to four inches across the cutting edge. I have found dozens of worn-out specimens of over three and a half inches wide, but only four perfect specimens have been found here by myself. These were found at Appatoonganie Lake and were enclosed in a rotten string bag. They measured over four inches across the cutting edge. I gave them to the late Dr. George Horne, and I believe that he passed them on to the National Museum. At this same lake I found about half a dozen specimens of a pirrie ranging up to five inches long by about an inch wide—these also were given to Dr. Horne. I am inclined to think that these gigantic tools were freaks that were made by one

man, a blackfellow who for some time followed the fortunes of Neaylon Bros. of Neaylon's Swamp, near Mungeranie, and later on of Appatoonganie. At both of these places and nowhere else have I found anything approaching these in size. At Neaylon's Lake I found hundreds of chipped-back knives—it was plainly to be seen that they had been chipped off the tuhlas as they got blunt, a dozen or so flakes would be lying in position and could with a little patience be re-assembled to make up a blunt edge of a tool.

Chipped-backed knives, so called, were too small to be used for anything, but they may occasionally have been used to open a vein in the arm to get blood for ceremonial purposes. Any sharp pointed flake or sharp bone that happened to be handy was used for this purpose.

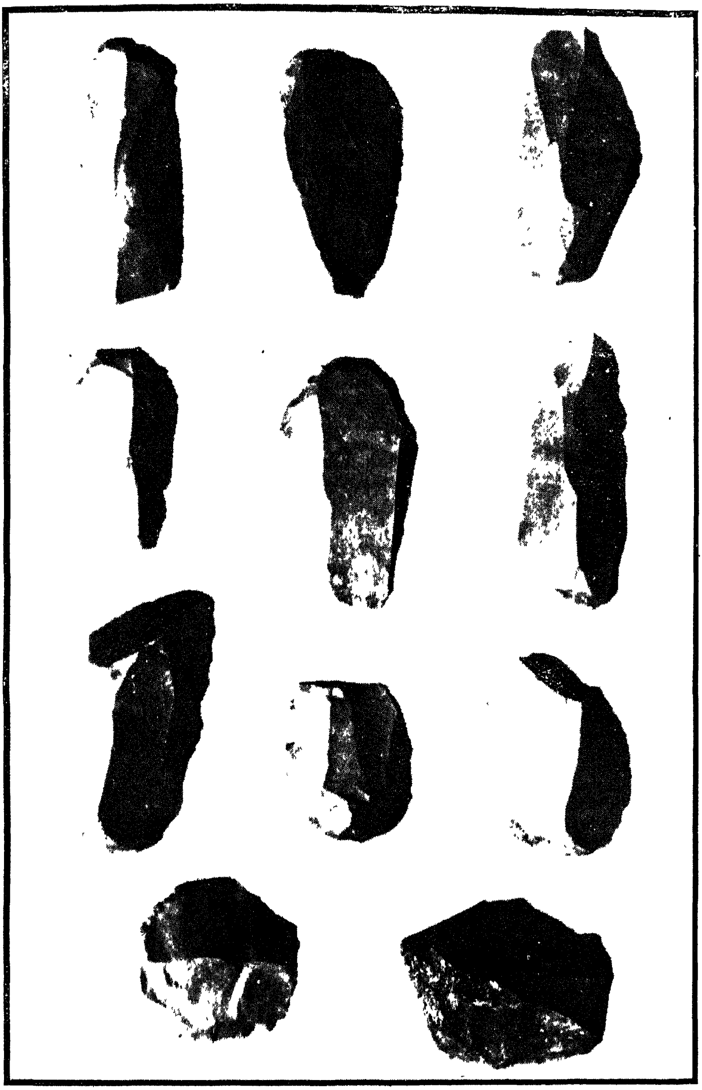
Knives (yutchawunta) were any sharp-edged flakes. The shape mattered little so long as they had a sharp edge. Anything with a hooked curve in it and over five inches long was usually set apart as a fighting knife, but for general purposes, as I have already stated, any sharp-edged flake was used. If the stone kept its edge it was mounted with a handle made of mindrie gum and emu feathers; if it lost its edge easily it was used for the purpose of the moment and cast aside. Knives were usually flaked off a parent stone that was firmly fixed in the ground. Certain places were dedicated to the various tribes and the one particular tribe was the only one that could get knives from that particular locality. The hammer stones were left lying where the last man had dropped them, but it was a point of honour to leave them. They might be wanted in a hurry some day. The idea of setting apart areas for one particular tribe was a device to keep the young men from fighting—it was almost inevitable that there would be a clash if young men of rival tribes or hordes met at a knife-flaking ground—and the old men did not like war, it meant too much discomfort and unrest.

Any flakes that came off in a leaf shape, rather thin with a keel and a thumb grip, were set apart for use as a circumcision knife—they were saved carefully for this purpose only. There was a lot of rivalry at a circumcision ceremony as to who could produce the best knife.

Small sharp-pointed flakes were used as pocket knives are used by white men. A flash young man would wear armbands of fur strung on each arm, and in these armbands he would have anything up to half a dozen fine knife flakes.

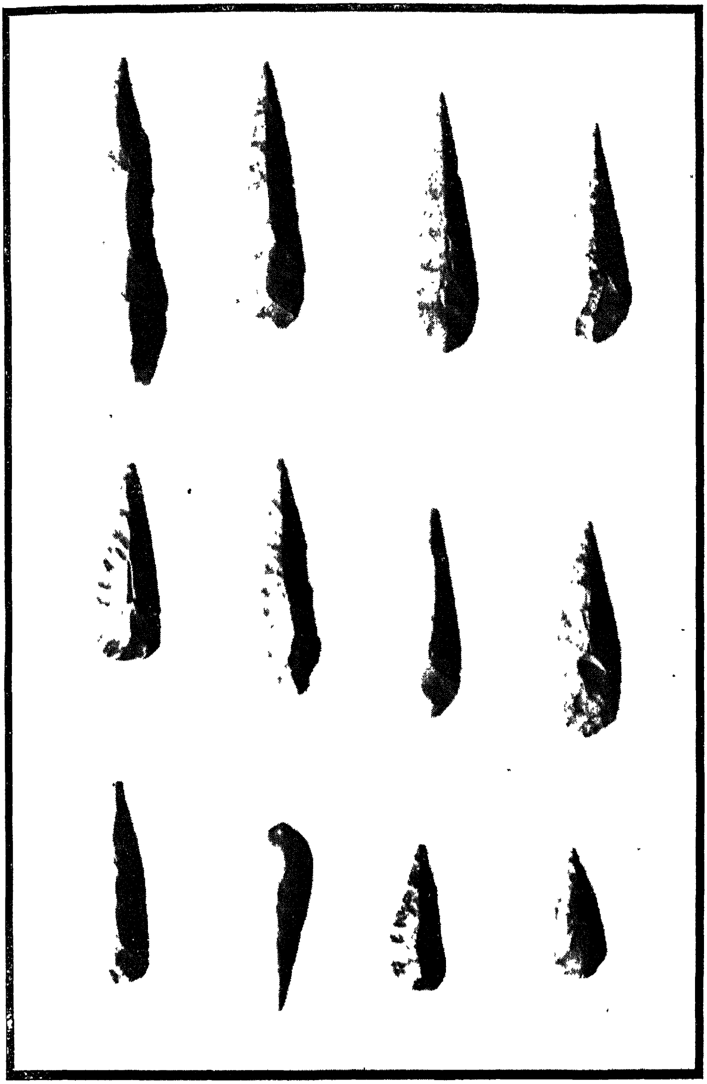
Figs. 1-7. Stone Implements from Lake Eyre District. Tuhla (chisels or adzes), hafted.

Figs. 8-18. Stone Implements from Lake Eyre District. Worn-out, discarded tuhla.

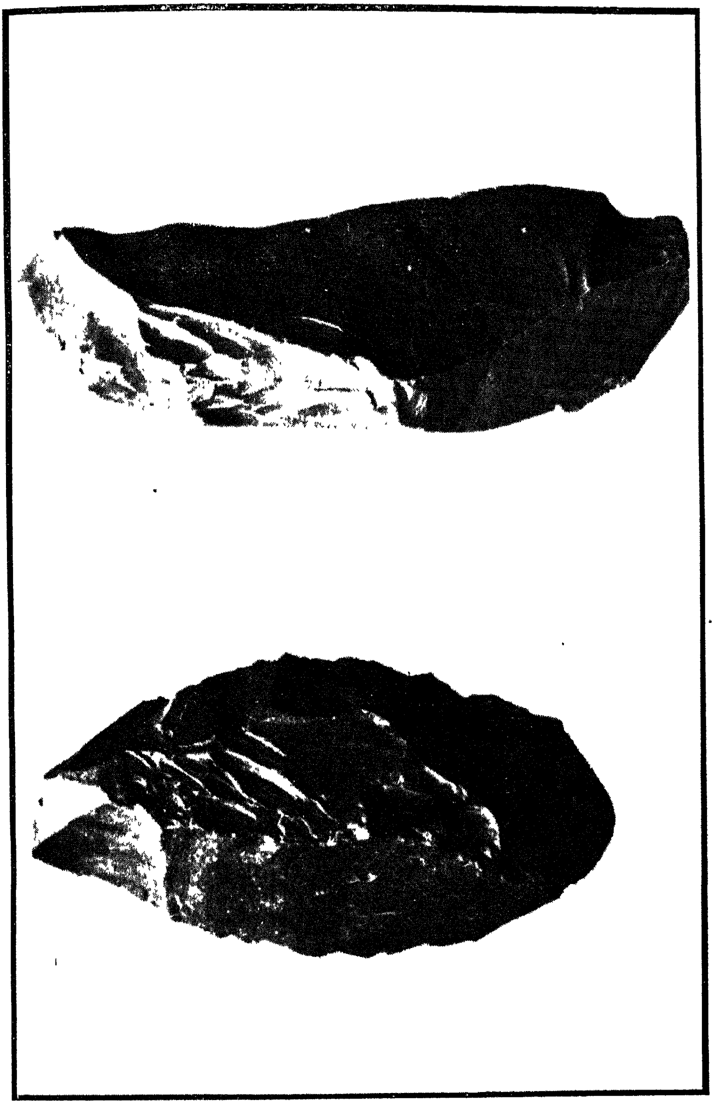


Figs. 19-29. Stone Implements from Lake Eyre District. Kallara (hand scrapers), not hafted.

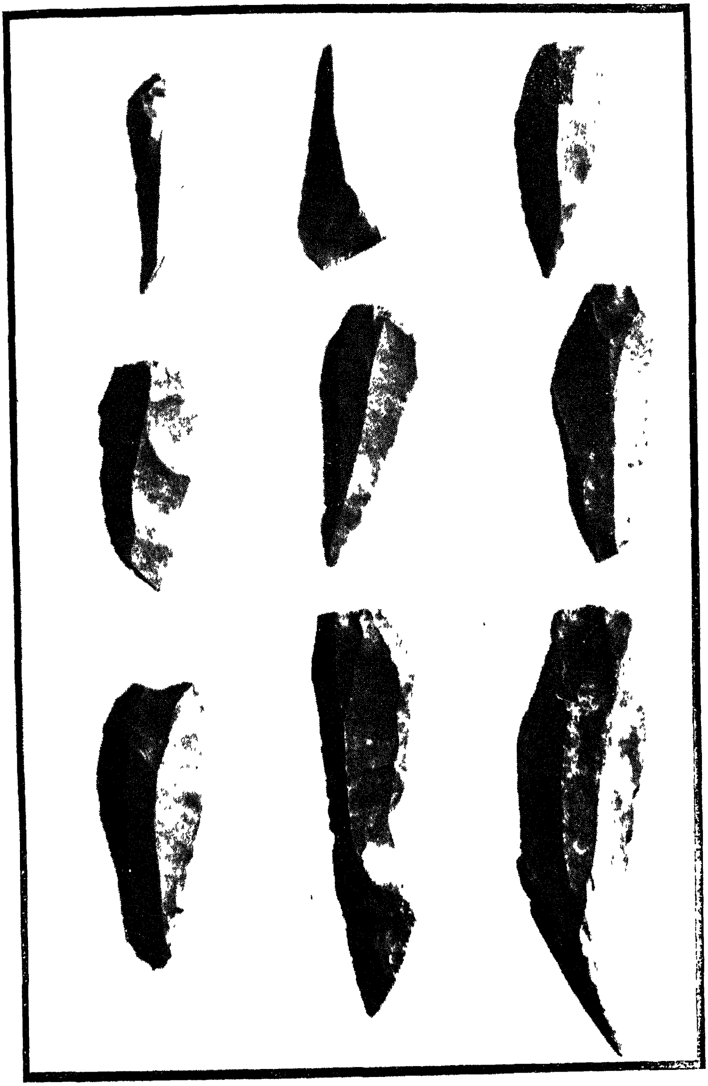
Figs. 30-33. Merna wadna, used also as gravers.



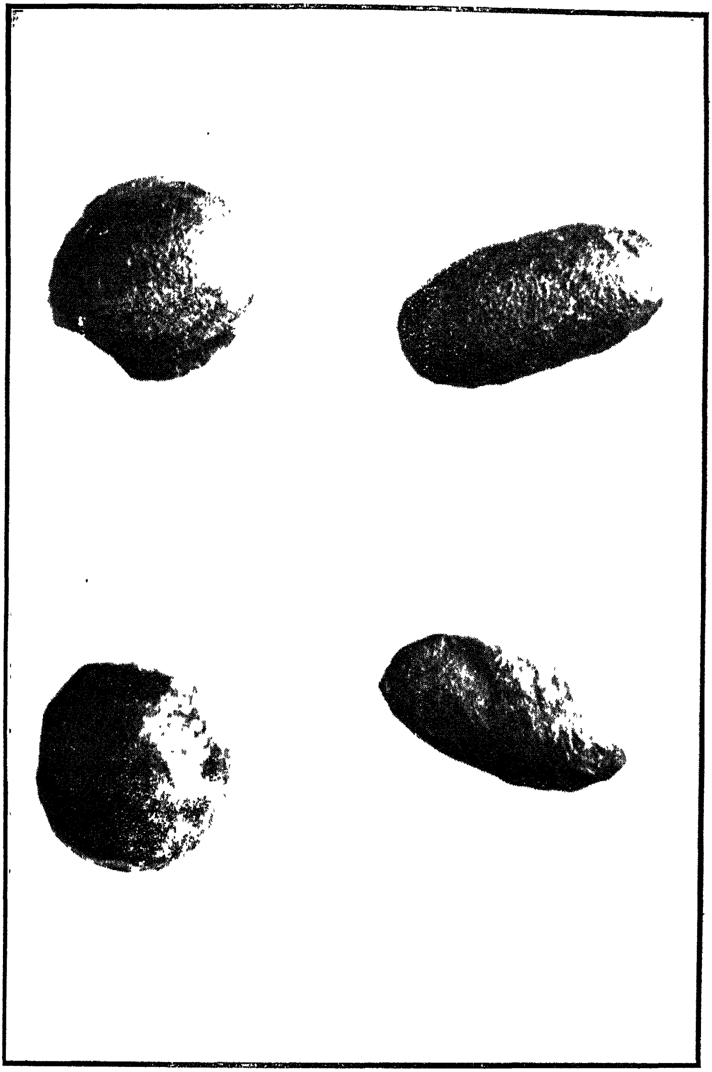
Figs. 34-45. Pirrie (12) (gravers), drill points, hafted.



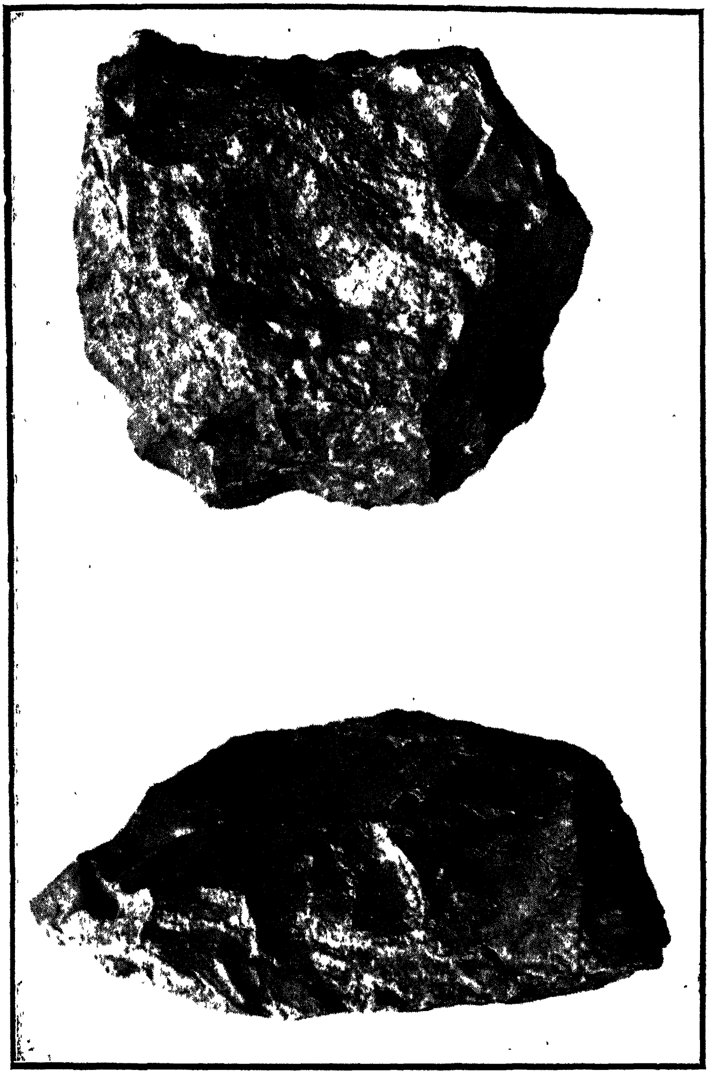
Figs. 46, 47. Vaginal knives.



Figs. 48-56. Knives, general and fighting.



Figs. 57-60. Aerolites (obsidian bombs). Called "Emu Eyes" by the natives, and were rolled or wrapped up into balls made of hair and fur string and pelted at Emus when they came into water.



Figs. 61, 62. Hand axe (R. W. Legge collection), Lake Eyre District.
Lower figure. Side view of same.

They would all be handled with mindrie gum and would sometimes be used as fighting knives. When using them for fighting the tribesman would place three of them in the palm of the hand with the points sticking out between the fingers. He would then close the hand and the three knives would stick out and would be used like claws. They were more feared than the large knives.

Another use to which these small flakes were put was to mark a body that had been killed by a kurdaitcha party to show that the man had been killed lawfully. When used for this purpose a string of feathers from the breast of the pink galah about six inches long would be attached to the flake with mindrie, and the flake would be pushed into the wound made by the spear man of the party. This practice is very similar to the use made of the small knife (kozuka) carried by the old Japanese Samurai.

In explanation, the kurdaïtcha party always consisted of three persons and they were appointed as avengers when someone had committed an offence against tribal law. Each one was armed differently, and the duty of the first man, who carried boomerangs, was to bring down the offender; then the second man, or No. 2, had to spear him, then No. 3 had to finally kill him with a club. Directly No. 3 had battered the skull No. 1 would place the feathered knife in the spear wound and leave it there.

The Urubunna tribe differed slightly in the way they mounted the knife. They would use any rough flake, bound on to a stick about fifteen inches long together with a short tail of white fur, of late years made from the white tips of a rabbit's tail. This was left in the wound in the same manner as the smaller knife of the Wonkonguru.

Another type of knife was used for the corresponding operation on women to that of sub-incision on men. The one operation, that of sub-incision, made it necessary to perform an operation on the women. The knife that was used for this purpose was selected for its keen edge, it had to be thick on the back so that it would not cut upwards and injure a vital organ, the back was carefully chipped until it was too blunt to cut and the knife was then used and thrown away—it was very rarely used a second time.

An ideal shape for this knife was about 3 inches long and an inch and a half wide, slightly hooked on the cutting

edge and about three-quarters of an inch wide on the chipped back. These knives are very rare in this country—sub-incision was not generally practised.

The ground stone axe does not seem to have been generally used. A hand axe very like a gigantic tuhla seems to have been more favoured. These were so chipped that when held in the hand the cutting edge was at right angle to the line of the wrist when the tool was held firmly; it was used with a chopping downward motion.

There is no doubt that all of the tools were evolved from the simple flake. One cannot help noticing, when handling them in bulk, how the knife either develops into the pirrie or the scraper, the scraper in turn merges into the tuhla. It would be a simple matter to pick up a series that would show the process of evolution.

The use of stone tools must have been before the Moora era as they have no Moora to represent the stone tools. Anyone who did or discovered anything for the benefit of the tribes became a Moora at death, such as the man who introduced fire, or the man who discovered the boomerang, or who introduced circumcision, but I have never discovered a single stone tool Moora.

The cylindro-conical and conical stones were the emblems of the Mooras. They were usually in pairs and were held by the oldest descendant of the original Moora. They were supposed never to be taken away from the home place of the Moora, but his descendant had the keeping of them. They were usually buried in the sand, so that it often happened that when the holder of a Moora died the burial place was not known, and as no one but the lawful owner knew what Moora they represented, they became valueless. They were always treated with respect and left severely alone, because they might represent some wicked Moora who would punish anyone who meddled with them. The pairs usually consisted of one stout stone and one thin stone. The thinner one always represented the female element. If the holder wished to intercede with the Moora he would grease the stones—if he wanted something for a woman, he would grease the male stone with a mixture of fat and red ochre; if he wanted help for a man he would anoint the female stone. The male stone would never help or intercede to a man, but would exercise all of its virtue or strength for a woman, and the female element responded in the same way. The holder of a Moora had a very real power over the tribe.

I had the Moora who once held all of this country. He was the Moora who discovered the use of red ochre, and I could and still can command any one of the local branch of the Wonkonguru to do anything I like, and I will have the assistance of all of the old men here to enforce my order. So long as I hold the Red Ochre Moora I represent the head of that totem or murdu.

We are at present suffering from the most severe drought, and the old men frequently suggest that I should anoint my Mooras with red ochre to get them to send rain.

The Aboriginals of this part did not use skin rugs or make use of skin (except for skin water bags), but 25 years ago I lived among the Kokatha and Parnkalla blacks over about Tarcoola and along the coast from Port Lincoln to Fowler's Bay on the west coast of South Australia. These people used skin rugs, but did not use any stone tools in the preparation of them. The skin was torn off the animal, not cut off, there was never any flesh adhering, the skin was pegged out with wooden pegs in some shady place until dry, and was then sewn into the shape required with a bone awl and animal sinew. When the rug was completed it was scored across diagonally in opposite directions—so that it made a diamond pattern—with an opossum or rabbit's tooth set in grass-tree gum. Of course a stone knife was used to make an opening in the skin so that the hunter could get his fingers in to pull the skin, but the knife was never used to cut the skin off the body.

A SKETCH OF THE VEGETATION OF THE CRADLE MOUNTAIN, TASMANIA,

and

A CENSUS OF ITS PLANTS.

By

C. S. SUTTON, M.B.

(Read 12th November, 1928.)

1. INTRODUCTORY.

Excepting some references in articles in the public press, no account of the flora of the Cradle Mountain, other than those of Weindorfer and the writer, appear to have been published. As far as one can ascertain, descriptions of the vegetation of the Tasmanian mountains have been, generally speaking, extremely few and incidental, and, with one exception, floristic only. Moreover, no list aiming at completeness of the plants of any individual mountain appears to have yet been made, Miss L. S. Gibbs's enumeration of species referring to all the mountain summit plateaux visited by her.

Although the writer has paid several visits to the Cradle Mountain, his stay there on any particular occasion has never been sufficiently prolonged to enable him to discriminate other than the more obvious of the plant associations, and this paper must accordingly be taken as nothing more than a preliminary or reconnaissance survey.

The locality here dealt with lies in Lat. 41° 40′S., about 70 miles due south from Burnie on the North Coast, and is reached from that port by rail, via Railton, to Sheffield, and thence by road, through Wilmot, Moina, and the Middlesex Plains.

2. TOPOGRAPHIC.

The Cradle Mountain, 5,069 feet, and its neighbouring elevations, the Barn Bluff, 5,114 feet, and Mount Brown, 4,607 feet, remnants of a dolerite sill, stand upon the north-western corner of the great Central Plateau of Tasmania, here about 4,000 feet above sea level. The three elevations are all more or less broken up into columnar masses, and the northern side of the first named, especially, is fringed with talus. On the southern, eastern, and northern sides the plateau has been shaped by glacial action into cirques, and cut into deep gorges by the branches of the Forth River, which discharges at Leith on the north coast. On the western side it has been scored by the branches of the Fury, a tributary of the Pieman River, which runs to the West Coast. Numerous lakes and tarns of glacial origin lie at various elevations. The largest of these, the Dove Lake at 3,150 feet, is rather more than a mile long and nearly 200 feet deep. The Crater Lake at 3,400 feet is almost half as long and somewhat deeper. Other notable areas of water are Lake Rodway at about 3,000 feet, Lake Wilkes on a shelf above Dove Lake and Lake Lilla, close to and at nearly the same elevation as the last named (3,125 feet).

The results of glacial action are everywhere apparent. Of the several cirques which have been bitten into the plateau, that on the southern side of the Cradle Mountain, and on the floor of which Lakes Flynn and Rodway are situated, is considered to be the finest example. This, according to Dr. Benson, once contained ice one thousand feet deep. What is described by him as a beautiful *roche moutonné* hill lies between the outlets of Lake Lilla and Dove Lake, and on the top of this are perfect examples of the removal of masses of rock by the plucking action of moving ice, leaving hollows now occupied by lakelets. There are moraines to the east

of the Cradle Valley, extending across the Dove River. Near the junction of this with the Valley creek there are hummocks amongst which are small pools.

Quoting Dr. Benson—"the four main formations in the "vicinity of Cradle Mountain and Barn Bluff are the Pre-"Cambrian schists and quartzites, the Permo-Carboniferous "conglomerates, sandstones, and mudstones, the Cretaceous "dolerite of the three highest elevations and the Pleistocene "glacial deposits."

That weathering is very actively taking place is evidenced by the frequence of stone fields and rock falls and by the numerous streams of broken rock of all sizes—stone runs, shingle slips, and gravel slides—making their way down the steeper slopes, few only having been stabilised by vegetation. The surface of the area, in short, is diversified to a very high degree.

3. CLIMATIC CONDITIONS.

Meteorologically the Cradle Mountain station would seem to belong to the West Coast district, but it is at present included in that of the Central Plateau. Precipitation records have been kept by Mr. Weindorfer at *Waldheim*—elevation about 3,000 feet—since 1918, and thermometric readings since 1919, and are as follow:—

Month.	Average Temperatures. Seven Years.							Averages for Eight Years.		
	Dry Mean	Wet Mean	Mean Max.	Mean Min.	Abs. Max.	Abs. Min.	Grand Mean	Hum.	Rainy Days	Precipitation.
January ..	52.6	49.8	63.1	39.8	86.0	27.0	52.1	80	17.6	616
February	55.5	52.4	66.3	41.8	91.0	29.0	54.0	82	14.4	557
March ..	49.4	47.9	58.7	37.7	77.0	25.0	48.2	90	19.4	678
April	45.7	44.8	53.8	35.6	74.0	26.0	44.7	90	17.7	739
May	41.2	40.3	48.3	33.5	62.0	21.0	40.8	88	20.3	1012
June	37.9	37.3	44.0	32.2	56.0	20.0	38.1	94	24.3	1243
July	36.5	35.7	42.7	30.0	59.0	20.8	36.3	93	24.1	1248
August ..	37.5	36.5	44.7	29.9	58.0	18.0	37.3	95	24.4	1047
September	40.4	39.3	48.8	32.0	66.0	21.0	41.8	91	23.0	1095
October ..	45.3	42.7	54.6	33.7	80.0	23.0	44.2	76	23.1	1025
November	50.2	45.9	60.0	35.2	85.0	25.0	47.7	67	19.9	831
December	52.7	49.2	62.9	38.3	89.0	27.0	50.6	75	19.2	655
Average ..	45.4	43.4	54.0	35.0	91.0	18.0	44.6	85	247.4	107.46

The records reveal a range of temperature of 73 (18 August, 91 February), and that the temperature may fall below freezing point in any month of the year. The wet mean, 43.43 (52.4 in February, 35.7 in July), shows a range of 16.7, as compared with 12 at Cape Sorell on the West Coast.

Precipitation is high (134.69 inches in 1924, 98.14 in 1918); the wettest months are the winter, 35.48 inches—though the highest record for any month, 23.21 inches, was in May, 1923—and the driest the summer, 14.06 inches, the lowest record for any month being, however, but .56 inch in April, 1923. The number of wet days ranged from 274 in 1924 to 220 in 1918. Snow may fall in any month, the average number of days when it occurred being 38—winter 16, summer 2.5. The ground at the lower levels, however, is rarely covered for more than a few days together, the subsequent rains usually leading to its quickly melting. The yearly average of frosty days is 144 (winter 62.4, summer 10.1).

Humidity is high (August 95, November 67) with a range of 28%, and may be compared with that of Kiandra, 4,640 feet, where it is 92% in June, the highest on the mainland.

The prevailing winds, the Roaring Forties, are from the west, 54.5 days, south-west 53.4, north-west 36.9 days. Those from the south 34 days, north-east 27, north 12.5, east 6, south-east 5 days.

The average of totally overclouded days is 196.

4. HUMAN AND ANIMAL INFLUENCES.

Skin hunters have visited the Cradle Valley and its vicinity for many years, and the button-grass has frequently been fired by them. Stock from the Middlesex Plains have rarely penetrated so far, but lately a few sheep and a horse or two have been depastured in the valley. They have, however, made very little impression on the vegetation, and the only alien plant so far noticed is the sorrel, *Rumex acetosella*, L.

Animals indigenous to the locality are the wombat, *Phascolomys ursinus, var. tasmanicus*, Lord, Bennett's wallaby, *Macropus ruficollis, var. bennettii*, Waterh., the rufous-bellied wallaby, *Macropus billardieri*, Less., the brush or black opossum, *Trichosurus vulpecula, var. fuliginosus*, Ogilby, the ringtail 'possum, *Pseudochirus cookii, Des.*, the tiger cat, *Dasyurus maculatus*, Kerr, the common native cat, *Dasyurus viverrinus*, Shaw, the platypus, *Ornithorhynchus anatinus*, Shaw, and the porcupine, *Echidna aculeata*, Garnot. The firstnamed is the most often seen and is responsible for many well-defined and well-graded tracks, which, though narrow, facilitate one's progress, especially in the more scrubby parts.

Rabbits have not yet been seen in the locality.

5. THE PLANT ASSOCIATIONS.

(i.) Forest.

Forest growth, varying in height, density, and composition, discontinuously covers most of the slopes and the heads of the streams.

(a) The *Athrotaxis-Nothofagus* Forest. This is a closed forest, ranging between 50 and 70 feet in height, occupying the higher slope of the north-western side of the Cradle valley, excepting the cirque near its upper end. Below it ends with striking abruptness, but above, as the crest of the plateau is neared, it dwindles in size until its members merge into the low subalpine scrub of Hounslow Heath.

The dominant species is *Athrotaxis selaginoides*, which occasionally attains a height of 100 feet and a stem diameter of six feet. *Nothofagus cunninghamii* is less frequent and here does no more than rival it in height, though elsewhere it may grow to twice the size. *N. gunnii*, the only deciduous tree in the island, is abundant, shrubby in habit, not often exceeding 20 feet. The other chief constituents, which with the deciduous beech may be said to compose the second story, are *Atherosperma moschatum*, *Phyllocladus rhomboidalis*, *Pittosporum bicolor*, *Telopea truncata*, *Drimys aromatica*, *Trochocarpa gunnii*, and *Archeria eriocarpa* More or less confined to the lower border are *Leptospermum lanigerum, var. montanum*, *Olearia pinifolia*, *Richea pandanifolia*, and *R. scoparia*, and in the outskirts are *Polystichum aculeatum*, *Histiopteris incisa*, *Oxalis magellanica*, and *Libertia pulchella*. Excepting an abundant growth of liverworts and mosses in the wetter places there is practically no ground flora. The trunks of the *Athrotaxis* are often thickly-clad with the russet-coloured *Hymenophyllum malingii*, and less abundantly with *H. wilsonii* and *Polypodium billardieri*. On fallen logs, with cryptogams, *Uncinia riparia* occurs occasionally.

(b) In the immediate vicinity of *Waldheim*, intervening between (a) and the grassland of the lower slope of the valley, on a surface which is in part rocky and much drier, is a narrow fringe of more open forest with many shrubs of varying height and some herbaceous plants. Here the members of several associations intermingle and four layers of vegetation can be plainly distinguished.

The tallest story is composed of *Eucalyptus muelleri* with *Athrotaxis selaginoides* (in pyramidal form), *Richea*

pandanifolia, *Leptospermum myrtifolium*, *Nothofagus gunnii*, and an occasional *Pittosporum* and *Phyllocladus* from the adjacent forest. The next layer, of the taller shrubs, is mostly made up of epacrids—*Cyathodes acerosa*, *Trochocarpa*, *T. gunnii*, *Richea scoparia*, *R. sprengelioides*—with *Drimys*, *Olearia pinifolia*, an odd tussock of *Gahnia psittacorum* and stunted *Eucalyptus coccifera*. Constituents of the dwarf subalpine scrub almost entirely form the third story, these being *Boronia citriodora*, *Epacris microphylla*, *E. serpyllifolia*, *E. lanuginosa*, *Oxylobium ellipticum*, *Leucopogon ericoides*, *Bauera*, *Pimelea*, *Calostrophus lateriflorus*, and a few plants of *Diplarrhena*. In the lowest layer are *Hibbertia procumbens*, forming flat mats, with large yellow flowers, the spreading *Leucopogon collinus* and *Tetracarpæa*, with not infrequently *Lagenophora billardieri*, *Stylidium*, *Oxalis*, *Libertia*, and *Senecio pectinatus*. Here also, of some half dozen ferns, *Blechnum penna-marina* and *Gleichenia* are most noticeable.

(c) *Eucalyptus-Athrotaxis Forest.*—On the eastern side and southern end of the Dove Lake a very close mixed forest extends from the water's edge to a varying distance up the steep slopes, gradually fading out in the shallow gullies. At the head of the lake it appears to attain its greatest density, and under its shelter reaches the level of the plateau. It is more complex than (a) but perhaps less so than the growth at *Waldheim*. Judging from portions traversed at both ends and a distant view of its main extent, the most prominent species are *Eucalyptus muelleri* and *Athrotaxis selaginoides* away from the lake, and *A. cupressoides* near the waterside. These seem to be scattered throughout in small clumps, though the *Eucalyptus* is more abundant and somewhat exclusive along the watercourse coming from Lake Wilkes. *Nothofagus cunninghamii* is also a leading constituent. The species next in order of tallness are *Leptospermum lanigerum*, *Richea pandanifolia*, *Nothofagus gunnii*, *Eucryphia billardieri*, *Cenarrhenes nitida*, *Anodopetalum biglandulosum*, *Persoonia gunnii*, *Archeria eriocarpa*, *Cyathodes acerosa*, *Drimys*, *Monotoca elliptica*, *Archeria serpyllifolia*, and *Oxylobium ellipticum*. In the few open spaces the most notable species are *Pimelea linifolia*, *Gaultheria hispida*, *Tetracarpæa tasmanica*, *Bauera*, *Olearia persoonioides*, and *Blandfordia*.

(d) *Eucalyptus-Nothofagus* Forest.—On the steep slope leading from the eastern side of the Crater Lake towards

the plateau another type, of low, open forest, exists. Here the surface is very rough and covered with broken rock, ranging in size from large boulders to gravel. Much of the surface is bare of vegetation, which, as might be expected, is strikingly xerophytic. *Eucalyptus coccifera*, about ten feet high, often with many stems branching from near the ground, is the dominant species. *Nothofagus cunninghamii* and *Phyllocladus* are taller but scattered and less frequent, but *Nothofagus gunnii* is more common. Finding a holding ground among the rocks are bushes, often very thickset, of *Orites revoluta*, *O. acicularis*, *Richea sprengelioides*, *R. scoparia*, *R. acerosa*, *Cyathodes straminea*, *C. acerosa*, *Epacris serpyllifolia*, and *E. lanuginosa*, all extremely sclerophyllous, *Microcachrys* and *Podocarpus*, *Oxylobium*, *Coprosma billardieri*, *Ozothamnus backhousii*, *O. ledifolius*, *Bæckea*, and *Drimys*.

In a lower story *Boronia citriodora*, *Bellendena*, *Bauera*, *Hibbertia*, and *Euphrasia brownii* are not infrequently present, and sparsely scattered are also *Tetracarpæa*, *Exocarpus*, *Luzula*, *Olearia persoonioides*, and *O. ledifolia*. In such an unfavourable station even the rare occurrence of *Blandfordia* and *Diplarrhena* was quite unexpected. *Blechnum capense*, *var. procera* was the only fern noted.

Another piece of forest on the eastern shore of Lake Lilla, which was, however, only passingly studied, contained, in addition to species mentioned as occurring in the others, *Banksia integrifolia*, *Telopea*, *Aristotelia*, *Acacia mucronata*, *Drymophylla*, *Sprengelia*, *Gaultheria hispida*, and *Townsonia viridis*.

Two other forms of low *Eucalyptus* forest occur towards the head of the Cradle valley. The one, on a surface covered with broken rock with very little visible soil, is close set and almost without ground flora. The other is more open, less tall, the trees with broader canopies, and is filled in mainly with a thick growth of *Bauera*.

These appeared to be the most obvious of the tree associations. Doubtless others can be recognised, but enough has been said to show their great variety, due to differences of substratum, slope, aspect, and exposure.

(ii.) The Dwarf Subalpine Scrub.

This is a very well-defined unit, prevailing mostly in the lower end of the valley, both on the flats and on the rising ground between the streams going to feed the Dove River.

It also occurs in patches in the grassland and ascends the slopes of the plateau where, at about 3,700 feet, it meets outlying cushion plants. It generally exists as a thickset growth about a foot or eighteen inches high. The most characteristic and frequent species composing it are *Boronia citriodora*, *B. rhomboidea*, *Melaleuca squamea*, *Oxylobium ellipticum*, *Bæckea lepticaulis*, *Epacris microphylla*, *E. serpyllifolia*, all now and again locally dominant, with *Hibbertia procumbens*, *Euphrasia brownii*, *Stylidium*, *Epacris lanuginosa*, *Hypolæna lateriflora*, *Casuarina distyla*, *Leptospermum rupestre*, *Sprengelia*, *Pultenæa subumbellata*, and *Comesperma*. Others less frequent are *Bellendena*, *Pimelea linifolia*, *Campynema*, *Xyris*, *Patersonia*, *Bossiæa*, *Thelymitra venosa*, and *Prasophyllum fuscum*. Not rarely it becomes mixed with the *Gleichenia-Restio* combination.

(iii.) THE GYMNOSCHŒNUS (BUTTON-GRASS) ASSOCIATION.

Gymnoschœnus adustus, with long, slender, rigid leaves and stems up to 5 or 6 feet long, in densely tufted form, associated with a number of smaller species, occupies much of the wet, sour ground in the valley. It is a very extensive plant association in Tasmania, covering several hundred square miles of what is popularly known as button-grass country. Being very inflammable it is frequently fired and is here often seen as blackened stumps. It is always greatly dominant. *Xyris*, *Hypolæna lateriflora*, *Cladium capillaceum*, *Sprengelia*, *Deyeuxia quadriseta*, *Carpha*, *Campynema*, *Abrotanella*, *Comesperma*, *Astelia* (in mats), *Drosera arcturi*, *D. binata*, *D. peltata*, *Claytonia*, *Scævola*, *Actinotus bellidioides*, *A. suffocata*, *Halorrhagis micrantha*, *Luzula*, *Patersonia*, *Diplarrhena*, and *Utricularia*, which are most frequently noted in its company, play a very secondary part in the make up.

On the ground between the burnt stumps, an invasion of plants from neighbouring associations is taking place. Most of these are from the Dwarf subalpine scrub, but others, not or only rarely found there, are *Mitrasacme montana* and *Rubus* in little mats, *Bauera*, *Gentiana*, *Lagenophora*, *Celmisia*, *Helichrysum pumilum*, *Senecio pectinatus*, *Pentachondra pumila*, *Leptospermum myrtifolium*, *L. lanigerum*, *Poa cæspitosa*, and *Gleichenia*. With the regrowth of the dominant species many of these will not persist, but doubtless a combination differing from that ordinarily seen will result.

(iv.) THE GLEICHENIA-RESTIO ASSOCIATION.

Another combination of plants occupying wet ground, especially in a zone along the edge of the forest in the Cradle valley and separating it from the grassland, consists almost entirely of *Gleichenia dicarpa,* here only a foot or so in height, with *Restio australis* and *R. complanatus.* Within it are occasionally found mats of *Astelia* and large mounds of *Sphagnum.*

(v.) THE SUBALPINE MEADOW ASSOCIATION.

Grassland covers the lower slopes of the Cradle valley, more particularly on the northern side. It is mainly composed of *Poa cæspitosa* in close tussocks, with a comparatively insignificant admixture of other grasses, such as *Hierochloe fraseri, H. rariflora, Microlæna tasmanica, Deyeuxia spp.,* and the allied *Carpha, Cladium capillaceum,* and *Luzula.* Here the composites, *Celmisia* and *Helichrysum lucidum,* are abundant, and *Helichrysum scorpioides, Leptorrhynchus squamatus, Podolepis, Craspedia,* and *Erigeron* somewhat less so. *Diplarrhena* is locally abundant and *Gentiana* and *Stylidium* scattered but frequent. Where the tussocks are not so overwhelmingly dense, or the growth is shorter, numerous smaller plants, such as the *Rubus, Herpolirion, Xanthosia dissecta, Viola hederacea, var. Sieberi, Daucus, Coprosma moorei, Lagenophora, Acæna sanguisorbe, Halorrhagis micrantha, Hydrocotyle hirta,* and also the taller *Ranunculus hirtus* and *Prasophyllum fuscum* are not infrequent.

Zonation is very plainly seen on the northern side of the valley. Above, at about 3,900 feet, the dwarf subalpine scrub of Hounslow Heath meets and merges with the *Athrotaxis-Fagus* forest, there thinned out and dwindled in height; then comes the forest (b), bordered by *Gleichenia-Restio,* and finally the grassland, which runs to the streamside, edged with *Helichrysums, Ozothamnus, Olearias, Leptospermums, Boronias, Richeas, Bæckea, Bellendena,* and others.

(vi.) AQUATIC AND BOG PLANTS.

Several plants affecting the wetter situations have already been mentioned, for both the *Gymnoschœnus* and the *Gleichenia-Restio* associations are those of wet ground. Other such associations or communities will surely be discriminated later. Without attempting to do so here, it will be sufficient to mention *Isœtes* growing submerged to a

depth of about two feet in Dove Lake and Lake Lilla, *Scirpus fluitans* and *S. inundatus* submerged or floating, *Myriophyllum pedunculatum*, *Utricularia*, *Cladium*, *Carex gaudichaudiana*, and *C. inversa* in water or on the bottoms of dried-up pools, and *Drosera arcturi*, *D. binata*, *Claytonia*, *Brachycome cardiocarpa*, *Trithuria*, and *Forstera* in muddy places—the last only along the edge of Dove Lake for about a chain or so, and *Epilobium billardierianum* from sphagnum cushions. Just outside the valley near the Dove River *Gunnera cordifolia* occurs in wide mats.

A riparian community is perhaps discernible, for *Athrotaxis cupressoides* prefers the waterside, *Blandfordia* is generally present there, the *Olearias*, *O. obcordata*, *O. persoonioides*, *O. floribunda*, *O. pinifolia*, and *O. stellulata*, *Ozothamnus backhousii*, *O. hookeri*, and *O. gunnii* seem to be found more often bordering streamsides than elsewhere, and this is perhaps also the case with such smaller plants like *Rubus*, *Hydrocotyle*, *Viola*, *Oxalis*, *Halorrhagis micrantha*, and *Acæna sanguisorbe*. In addition, many plants from neighbouring associations like *Richea pandanifolia*, *Drimys*, *Nothofagus gunnii*, *Leptospermums* from the forest, *Boronia citriodora* and *B. rhomboidea*, *Bellendena*, *Bæckea*, and other members of the subalpine scrub as well as *Cyathodes acerosa*, *Richeas*, and *Orites* are not seldom in the same situation.

(vii.) The Subantarctic Fell-field.

The plateau on which the Cradle Mountain, the Barn Bluff, and Mount Brown rest is about 4,000 feet above sea level, and is divided into two main parts by the Fury Gorge, the head of which closely approaches the southern end of the ridge of the Cradle Mountain. On the northern side the formation is Pre-Cambrian and the surface is greatly diversified. Broken rock, from large boulders to coarse gravel and sand, covers a large part of it. Areas of bare rock are frequent. Where the surface is level a thin layer of soil is found, but only in the shallow depressions, bounded by low outcropping rock, is it of any depth, and here perhaps remains more or less moist under all weather conditions. The soil is dark and tenacious and mixed with coarse white sand. From the plateau many steep rock falls and gravel slides run down, some of them stabilised by vegetation.

On the further or southern side of the Fury Gorge sandstone prevails; the surface is more level, and where boulders

occur they are often in the form of a natural pavement. The soil is much lighter, of a yellowish or buff colour, finer in texture, and more friable.

Judging from the records kept at *Waldheim*, which is in a rather sheltered position and about 1,000 feet lower, it can be safely concluded that the climatic conditions on the plateau are more severe. Precipitations must be greater, probably as high as at Mount Read a little to the south-west, where the average is more than 120 inches, humidity higher, snow-falls more frequent and persistent, and the mean temperature lower. The surface also is fully exposed to the force of the strong, prevailing westerly winds.

In spite of the greater moisture and humidity, however, and because of the greater evaporation from lower atmospheric pressure, more intense insolation and unrestricted wind action, aridity sometimes results, certainly in the summer months, when, the thinly covered rock slopes allowing a quick run-off, the thin veneer of soil can be broken up into dust after a short spell of fine weather.

The nature of the substratum and the climatic conditions—the habitat—have resulted in that peculiar type of vegetation known as the fell-field, a fundamental unit seemingly without parallel on the mainland, and presenting the following characteristics: — A discontinuous and strongly xerophytic vegetation with a rather varied flora, often of stunted growth—nanism—which, except in sheltered places or amongst boulders, is generally not more than about eighteen inches high and often much less. The "cushion" or "bolster," or perhaps more appropriately, the "boulder" growth form. The rarity of bulbous or tuberous species and the almost entire absence of annuals. The frequence of tufted plants, forming mats. Rosette plants not, however, numerous. The scanty branching of several woody species, carrying tufts of sclerophyllous foliage at the ends of their branches. The prostrate, espalier form in some species, forming elfin-wood. Leaves, with few exceptions, entire, usually small, erect or appressed, coriaceous or ligneous, rigid and pointed, round or tightly rolled, shining or more or less densely felted with hairs.

The Bolster Plants.—The most striking feature of the plateau vegetation is due to the presence of four plants—*Dracophyllum minimum* (Epac.), *Donatia novæ-zelandiæ* (Stylid.), *Ewartia meredithæ*, and *Pterygopappus lawrencii* (Comps)—which have developed the bolster growth-form. Sometimes one or another of them, especially the two first

named, occupy quite wide areas, more particularly in the shallow wet depressions already referred to, where the bolsters may measure two or three feet across and may stand up perhaps a couple of feet, at places surrounded by bare muddy soil or at others closely hedged in by low scrub which perhaps not infrequently ultimately overwhelms and supplants them. On flat or sloping rock surfaces all the species tend to a more extensive and flatter or matlike form, but still with a more or less rounded contour. In these situations too they seem to lose their exclusiveness and two, three, or all of them may combine to form one large shallow bolster as much as three yards across. Often very pleasing patterns are produced by the interweaving of the sage and russet colours of the composites with the dark green of the two other species, the smoothness of contour being always preserved. These four plants, and especially the *Donatia* and *Dracophyllum*, afford very perfect examples of epharmonic convergence.

Many of the bolsters act, like the stems of the tree ferns in the gullies at a lower altitude, as seed-beds for other plants, and several small epacrids like the *Pentachondra*, *Sprengelia*, *Cyathodes adscendens*, and *Leucopogon collinus*, as well as *Drosera arcturi*, *Celmisia*, *Gleichenia*, *Calostrophus*, *Oreobolus*, and others may be found growing from their surface. The cryptogams *Dicranium billardieri* and *Rhacomitrium pruinosum* are also not uncommonly found on them.

Dracophyllum minimum, F. v. M.—Bolsters green, very hard. Leaves lanceolate, appressed, imbricate, pointed, sheathing at the base. About 24 were counted in a rosette and 35 of these were found to occupy a square inch of the surface. Lobes of the corolla tube white, obtuse, spreading and not removed from the surface. This species is close to *D. muscoides* of New Zealand, where eighteen occur. One also is in Australia, five in New Caledonia, and one in Lord Howe Island.

Donatia novæ-zelandiæ, Hook.—Bolsters dark green, very hard, not strongly domed like the preceding but indistinguishable from it without very close scrutiny. For this reason it is difficult to say which is more prevalent, but taken together they are much more abundant than the two composites. Leaves, like those of the *Dracophyllum*, entire, imbricate, and about two lines long but more linear, shining, and dotted, blunter and broadening towards the base, where they are invested with woolly hairs. Some 50 or 60 compose each rosette, 22 of which were counted occupying a square inch of

the surface. The flowers are also white, solitary, terminal, and sessile, the lobes rather obtuse and less spreading, and are said to open a little earlier. Stout adventitious roots are to be found coming off at right angles from the stems just below the surface and ramifying amongst the branches which still retain their dead leaves. This species also occurs in New Zealand and one other in southern Chili.

Ewartia meredithæ (F. v. M.).—Bolsters softer, less domed, and of a pleasing russet grey colour. The leaves are oblong or rather spathulate, woolly at the base. There are from 12 to 18 in each rosette, and from 25 to 45 of these fill the space of a square inch. The flowers are solitary and terminal, white or pink, and when open the white, spreading bracts lie on the surface, but as the seeds ripen the stalks lengthen until they stand out perhaps three-quarters of an inch or more. There are two other species in Tasmania, one of which is found on the mainland, where there is yet a fourth.

Pterygopappus lawrencii, Hook.—Perhaps less common than the last. Tends to make flatter, harder, and less prominent growths of a grey green or sage colour. Leaves from ½ to one line long, broadly cordate, imbricate, hairy on the inner surface and minutely mucronate. About 12 form the rosette and as many as 125 of these can be counted within the area of one square inch. The flowers are solitary, terminal, very minute, without spreading bracts, at first sessile, but the pedicle lengthens later. This species is monotypic and endemic.

Centrolepis monogyna, Benth., is the only other plant forming a very dense growth, which in this case is rounded and from two to twenty inches in diameter.

The bolster plants are not entirely confined to the plateau, occurring also on the moraine to the east of the Crater Lake, sparingly and in small size at the edge of Hounslow Heath, just across the Cradle valley, and as still smaller plants sparsely scattered along the western side of Dove Lake, close to the water.

The bolster growth form would appear to possess many advantages. The plant so composed is proof against the strongest wind pressure—it is as immovable as the rocks on which it may grow. By the closeness of its surface and the nature of its leaves its interior is wind-free and transpiration is reduced to a minimum. Moisture being retained, the interior remains comparatively warm and is not subject to such changes of temperature as affect plants of different

habits. The dead leaves and branches are not shed and lost to the plant, but remain in its interior, undigested probably for a long period, and in the meantime serving the purpose of holding moisture. Eventually, it may be after years, when their disintegration does take place, they become available for its nourishment, and thus the plant lives largely on its dead self, having achieved what seems to be the most economical of all possible arrangements. These plants, moreover, impress one as being of great age, probably rivalling many forest trees in this respect.

The extreme density of some of these bolsters can be imagined when it is stated that while no traces were left on stepping from one to another of them, as both Cunningham and Pennell record in the case of similar plants in South America, the writer found it necessary to drive his heel into the surface of the *Dracophyllum* and the *Donatia* bolsters with some force before making any impression.

The filling material within the bolsters was not investigated.

Rosette, Tufted, and Mat-forming Plants.—Although a few only of the plateau plants, such as *Dichosciadium ranunculaceum*, *Oreomyrrhis andicola*, both with hirsute, divided leaves, strong tap roots and mainly confined to pockets of soil in crevices of the dolerite, *Abrotanella, Anemone, Lagenophora, Helichrysum milligani, H. pumilum*, and the *Plantagos*, form distinct rosettes, the great majority of the herbaceous species are tufted. *Ourisia*, a dolerite plant, *Stylidium, Ranunculus gunnianus, Poa, Drosera arcturi, Erigeron, Senecio, Gentiana*, the *Actinotus, Luzula*, and *Geranium* usually form individual tufts. Others, by branching below ground, or by close association, form mats. The most remarkable of these mats are formed by *Astelia*, which often covers wide spaces with its close-set tufts of large, coarse, pointed leaves. These are densely felted at their base and, like those of the bolster plants, appear to decay very slowly and most effectually hold water against any possible aridity. Other mat-forming species, small and generally occupying wet ground, are *Herpolirion, Claytonia, Gratiola*, the *Mitrasacmes*, the *Cotulas, Oreobolus, Diplaspis*, and *Caltha*. The last named, so far noted only in one particular wet gully, there joins with the *Diplaspis* in covering closely several square yards of the surface, both being very stunted in growth and scarcely rising above it.

Aciphylla, a deeply rooted, dolerite plant, branching above ground, makes dense but not hard mats with its

finely divided, light green leaves, and the *Rubus* and *Hibbertia* may be placed in the same category.

The *Orites*, *Pentachondra*, the *Cyathodes*, *Sprengelia*, *Richea scoparia*, *R. sprengelioides*, *R. acerosa*, *R. gunnii*, *Coprosma nitida*, *Olearia ledifolia*, *O. persoonioides*, and the boulder plants are examples of those carrying sclerophyllous leaves mostly confined to the ends of the branches.

The low scrub of the plateau is composed of several members of that occurring in the valley with others not seen there, such as *Olearia ledifolia*, *Helichrysum backhousii*, *Richea acerosa*; and of the conifers, *Microcachrys*, *Phærosphæra*, *Podocarpus*, and *Fitzroya*, which are however rather exclusive, more local and taller—up to four feet or so—except in exposed parts, where they may grow in prostrate or espalier form for many feet.

Among large rocks and on the boulder-falls are found varying combinations of these woody plants, growing in larger dimensions with *Coprosma nitida*, *Persoonia*, *Fagus gunnii*, the smaller *Pimelea sericea*, and *Cyathodes straminea*.

In the more open areas, away from the scrub, the most conspicuous plants are *Celmisia*, *Senecio*, *Helichrysum milligani*, *H. pumilum*, *Stylidium*, *Veronica nivea*, *Euphrasia collina*, and *Anemone*, this last also seen in flower amongst the prostrate pines.

Colonies of the attractive *Milliganias*, with leaves similar to the *Astelia* but much longer, grow widely in close and exclusive association in certain secluded places.

6. A COMPARISON.

A comparison of the floras of the Cradle Mountain and the mountains of the mainland is of considerable interest. While, as might be expected, there is great likeness between those of the lowlands on each side of Bass Strait, on the highest elevations the differences are many and striking.

Of the 282 species listed for the Cradle Mountain 91, or more than 32%, are unknown on the mainland; 85 of these are strictly confined to the island, and the others—*Hymenophyllum malingii*, *H. peltatum*, *Hierochloe fraseri*, *Gaultheria antipoda*, *Pernettya tasmanica*, and *Donatia novæ-zelandiæ*—are found elsewhere only in New Zealand.

Twenty-two genera—*Prionotes*, *Anodopetalum*, *Tetracarpæa*, *Agastachys*, *Bellendena*, *Milligania*, *Pterygopappus*, *Cenarrhenes*, *Microcachrys*, and *Athrotaxis*, all exclusively Tasmanian—and *Campynema*, with only one other species in New Caledonia—*Archeria* and *Townsonia*, both confined to Tasmania and New Zealand—*Donatia*, *Forstera*

(*Phyllachne*), *Ourisia*, and *Pernettya*, to these places and South America—*Phyllocladus* to New Zealand and Borneo, and *Fitzroya* to Chili—*Anemone crassifolia*, the only representative of the genus in Australasia—*Œnothera*, which has thirty species in America, and *Gunnera*, with a wider range than any of the preceding, South Africa, Java, Sandwich Islands, New Zealand, and South America—are not represented in Australia.

Four other alpine genera occurring in other parts of Tasmania, but not yet known at the Cradle Mountain—*Gaimardia*, *Chlorophyton*, *Hewardia*, and *Thismia*—are also absent from the mainland.

Nothofagus gunnii, the deciduous beech, has its nearest ally in Fuegia. On the other hand, only two Australian alpine genera—*Seseli* and *Wittsteinia*—are missing from Tasmanian mountains.

While, according to Stirling, not more than one tenth of peculiarly Australian plants occur in the Alps at altitudes above 2,000 feet, about 70% of the 190 endemic plants of Tasmania are confined to mountain situations or descend to lower levels only at the west and south-west coast.

As Kosciusko appears to be the sole mountain in Australia whose plants have been more or less thoroughly recorded, an individual comparison may be made with it. Of its 310 species only 86, or 27%, are common with those at the Cradle Mountain, and taking those above tree level—130 at the latter and 103 at Kosciusko—42 are found in both. Of the eight conifers at the Cradle Mountain seven are endemic, only the *Podocarpus* being represented at Kosciusko.

At the Tasmanian mountain *Epacrids* are a very prominent feature, 31 species (18 endemic) with six *Richeas*, as compared with 15 at Kosciusko with one *Richea* and six others common to the two. Composites number 39 (12 endemic), as against 47 at Kosciusko. Nine *Proteaceæ* occur at each place, none common, and seven of the Cradle Mountain species are endemic. Four of the five Eucalypts are peculiar. Leguminous plants are remarkably few, five only, all Australian, and the *Oxylobium*, which is very abundant, is the only one of the 21 occurring at Kosciusko.

Finally, there are the four plants at Cradle Mountain having the solid bolster or cushion habit which is xerophytic, and, although not unknown in hot, arid, desert places, is generally the outcome of conditions prevailing in high altitudes and low latitudes, attaining its greatest development on the mountains of South America, in Fuegia, the subantarctic islands, and New Zealand.

My best thanks are due to Mr. Leonard Rodway, who determined the mosses, hepatics, lichens, and some others, and to Mr. Gustave Weindorfer—to whom I am indebted for the meteorological records—for revising the census and for the great assistance he gave me on my several visits to *Waldheim*.

CENSUS.

	FOREST.				Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
HYMENOPHYLLACEÆ.	a	b	c	d					
Hymenophyllum									
malingii, Hook.	a	...	a	...	...	...	...	...	...
tunbridgense (L.), Sm.	f	...	...	...	...	...	...	...	...
peltatum (Poir), Desv.	o	...	...	...	...	...	...	...	...
marginatum, H. & G.	...	...	...	...	...	...	...	r	...
POLYPODIACEÆ.									
Polystichum aculeatum (L.), Schott	o	o	o	o	...	...	...	...	...
Asplenium flabellifolium, Cav.	r	...	...	...	...	...	...	...	...
Blechnum									
capense (L.), Schl., *v. procera*	o	o	f	o	...	...	...	...	...
penna-marina (Poir), Kuhn	o	o	f	o	...	...	...	...	r
Histiopteris incisa (Thunb.), J. Sm.	o	...	...	...	...	...	...	...	...
Polypodium billardieri (Willd.), Chr.	f	f	f	...	...	...	...	...	...
GLEICHENIACEÆ.									
Gleichenia dicarpa, R. Br.	...	o	...	...	f	f	o	...	f
LYCOPODIACEÆ.									
Lycopodium									
scariosum, G. Forst.	r	r	r	...	...	...	r	...	r
laterale, R. Br.	...	...	...	...	...	o	...	...	r
clavatum, L.	...	...	...	...	...	o	r	...	...
selago, L.	...	...	...	...	...	...	...	...	o
ISŒTACEÆ.									
Isœtes lacustris, L.	...	...	...	...	...	...	...	o	...
TAXACEÆ.									
Pherosphæra hookeriana, Archer	...	...	...	...	...	...	...	...	o
Podocarpus alpinus, R. Br.	...	...	...	o	...	...	...	...	f
Microcachrys tetragona, Hook.	...	...	...	o	...	...	...	...	ld
Phyllocladus rhomboidalis, Rich.	o	o	o	o	...	...	...	...	o
PINACEÆ.									
Athrotaxis									
cupressoides, Don.	...	...	o	...	...	...	...	...	...
selaginoides, Don.	d	...	o	...	...	...	...	...	...
laxifolia, Hook.	vr	...	...	...	...	...	...	...	...
Fitzroya archeri, B. & H.	...	...	...	o	...	...	...	...	o

	FOREST. a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
GRAMINEÆ.									
Microlæna tasmanica, Hook.	...	...	...	...	...	...	f	...	...
Hierochloe									
redolens, R. Br.	...	...	...	...	...	o	o	...	r
rariflora, Hook. f.	...	...	...	...	...	...	o	...	...
fraseri, Hook.	...	...	...	...	...	...	o	...	...
Echinopogon ovatus, Beauv.	...	...	...	...	...	...	r	...	...
Amphibromus nervosus (R. Br.), Hook. f.	...	...	...	...	...	...	r	...	...
Calamagrostis									
filiformis (Forst.), Pil.	...	...	...	...	...	...	o	...	...
rudis, Steud.	...	...	...	...	...	...	o	...	...
quadriseta (Lab.), Spreng.	...	...	...	...	...	...	o	...	...
Pentapogon quadrifidus (Lab.), Baill.	...	...	...	...	...	...	o	...	...
Danthonia pauciflora, R. Br.	...	...	...	...	...	...	o	...	...
Poa cæspitosa, G. Forst.	...	o	...	o	f	o	d	...	o
Agropyron pectinatum, Beauv.	...	...	...	...	...	...	...	...	...
CYPERACEÆ.									
Scirpus									
inundatus (R. Br.), Poir.	...	...	...	...	...	...	...	o	...
fluitans, L.	...	...	...	...	...	...	...	o	...
crassiusculus (Hook. f.), Benth.	...	...	...	...	...	...	...	...	o
cernuus, Vahl.	...	...	...	...	...	...	...	...	o
antarcticus, L.	...	...	...	...	...	...	...	...	o
Heleocharis sphacelata, R. Br.	...	...	...	...	...	...	...	r	...
Carpha alpina, R. Br.	...	...	...	...	...	o	a	...	o
Cladium capillaceum, C. B. Clarke	...	...	...	...	o	o	a	...	...
Gahnia psittacorum, Lab.	...	o	o	o	...	...	...	...	...
Gymnoschœnus adustus, Nees.	...	...	o	o	f	d	...	...	...
Oreobolus pumilio, R. Br.	...	...	...	...	...	...	...	...	a
Uncinia									
riparia, R. Br.	o	...	...	...	...	...	...	...	...
compacta, R. Br.	o	...	...	...	...	...	...	...	...
Carex									
gaudichaudiana, Kunth.	...	...	...	...	...	...	...	o	vr
inversa, R. Br.	...	...	...	...	...	...	o	...	...
pumila, Thunb.	...	...	...	...	...	...	o	...	...
RESTIONACEÆ.									
Lepyrodia muelleri, Benth.	...	...	...	...	...	...	f	...	...
Restio									
australis, R. Br.	...	...	...	...	f	f	f	...	o
complanatus, R. Br.	...	...	...	...	f	f	f	...	o
Hypolæna									
lateriflora, Benth.	...	f	...	...	a	f	o	...	f
fastigata, R. Br.	...	...	...	...	o	...	...	...	o
CENTROLEPIDACEÆ.									
Centrolepis monogyna, Benth.	...	o	...	...	...	...	...	...	f
Trithuria filamentosa, Rod.	...	...	...	...	...	...	...	...	r
XYRIDACEÆ.									
Xyris operculata, Lab.	...	...	...	...	f	f	...	...	

	FOREST. a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
JUNCACEÆ.									
Luzula campestris, DC.	...	o	...	f	...	o	f	...	f
Juncus									
pauciflorus, R. Br.	...	...	...	...	...	...	o	...	...
capillaceus, Hook.	...	...	...	...	...	...	o	...	...
communis, E. Mey.	...	...	...	...	...	...	...	o	...
LILIACEÆ.									
Herpolirion novæ-zelandiæ, Hook. f. . .	...	r	...	...	...	o	f	...	r
Blandfordia marginata, Herb.	...	...	r	o	...	...	...	...	r
Astelia alpina, Banks & Sol.	r	r	r	f	...	f	...	...	a
Drymophila cyanocarpa, R. Br.	...	r	o	...	...	...	...	...	...
Milligania									
densiflora, Hook.	...	...	...	...	...	...	...	...	la
longifolia, Hook.	...	...	...	...	...	...	...	...	f
lindoniana, Rod.	...	...	...	...	...	...	...	...	f
Dianella tasmanica, Hook. f.	...	...	...	...	...	...	...	...	...
AMARYLLIDACEÆ.									
Campynema lineare, Lab.	...	...	...	...	o	f	o	...	f *
IRIDACEÆ.									
Diplarrhena moræa, Lab.	...	o	...	f	...	f	la	...	o
Libertia pulchella, Spreng.	f	o	f	o	r	...	...	...	...
Patersonia glauca, R. Br.	...	...	...	...	o	o	...	...	...
ORCHIDACEÆ.									
Townsonia viridis (Hook. f.), Schlech.	r	...	...	...	...	...	...	...	...
Corysanthes pruinosa, R. Cunn.	...	r	...	...	...	...	...	...	...
Caladenia angustata, Lindt.	...	r	...	...	...	...	...	...	...
Thelymitra									
venosa, R. Br.	...	...	...	...	...	f	o	...	...
cyanea, Lindl.	...	...	...	...	...	f	o	...	...
Pterostylis									
nutans, R. Br.	...	...	...	...	...	...	r	...	...
cycnocephala, Fitz.	...	...	...	...	...	...	r	...	...
Prasophyllum									
fuscum, R. Br.	...	...	...	...	...	f	f	...	...
brevilabre, Hook. f.	...	...	...	...	...	...	r	...	...
Chiloglottis gunnii, Lindl.	...	r	...	...	...	...	...	...	...
CASUARINACEÆ.									
Casuarina distyla, Vent.	...	o	...	o	f	...	...	...	...
FAGACEÆ.									
Nothofagus									
gunnii, Hook.	a	f	f	f	...	...	...	...	o
cunninghamii (Hook. f.), Oers. . .	a	o	f	o	...	...	...	...	...
PROTEACEÆ.									
Agastachys odorata, R. Br. (f. in Sutton's Gorge)	...	...	r	...	...	...	...	...	...
Bellendena montana, R. Br.	...	...	...	o	a	...	...	...	o

*Another in New Caledonia.

	FOREST. a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
Cenarrhenes nitida, Lab.	...	...	f	o	o	...	...	...	o
Persoonia gunnii, Hook.	...	...	f	f	o	...	...	...	o
Orites									
acicularis, R. Br.	...	...	o	f	o	...	...	...	f
revoluta, R. Br.	...	...	...	f	o	...	...	...	f
Hakea acicularis, R. Br., *var. lissosperma*	...	...	o	...	...	...	...	...	...
Telopea truncata, R. Br.	o	o	o	...	o	...	...	...	o
Banksia marginata, Cav.	...	...	o	...	...	...	...	...	...
SANTALACEÆ.									
Exocarpus humifusa, R. Br.	...	...	...	o	r	...	...	...	o
PORTULACACEÆ.									
Claytonia australasica, Hook. f.	...	...	...	...	...	f	o	o	o
CARYOPHYLLACEÆ.									
Colobanthus billardieri, Fenzl.	...	...	...	...	...	...	...	...	o
Scleranthus biflorus, Hook. f.	...	...	...	...	...	...	r	...	...
RANUNCULACEÆ.									
Anemone crassifolia, Hook.	...	...	...	...	...	...	...	...	o
Ranunculus									
gunnianus, Hook.	...	...	...	...	...	...	r	...	o
hirtus, Banks & Sol.	...	...	...	...	...	...	f	...	...
lappaceus, Sm.	...	...	...	...	...	...	f	...	...
var.	...	...	...	...	...	...	...	...	r
Caltha introloba, F. v. M.	...	...	...	...	...	...	...	...	la
WINTERANACEÆ.									
Drimys aromatica, F. v. M.	a	o	a	o	o	...	...	...	o
MONIMIACEÆ.									
Atherosperma moschatum, Lab.	o	...	o	...	...	...	...	...	...
CRUCIFERÆ.									
Cardamine									
dictyosperma, Hook.	...	...	...	...	...	...	...	...	o
hirsuta, L.	...	...	...	...	...	...	a	...	...
radicata, Hook.	...	...	...	...	...	...	...	...	r
DROSERACEÆ.									
Drosera									
arcturi, Hook.	...	...	...	...	...	f	...	f	f
binata, Lab.	...	...	...	...	...	f	...	r	...
peltata, Sm.	...	...	...	...	...	f	o	...	...
pygmæa, DC.	...	...	...	...	...	...	r	r	...
PITTOSPORACEÆ.									
Pittosporum bicolor, Hook.	o	r	o	...	...	...	...	...	...
Marianthus procumbens, Benth.	...	...	...	...	...	...	r	...	...
Billardiera longiflora, Lab.	r	...	...	...	...	...	...	...	...

	FOREST. a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	*Fell-field.*
SAXIFRAGACEÆ.									
Tetracarpæa tasmanica, Hook.	...	f	o	f	o	...	...	...	o
Bauera rubioides, Andr.	...	o	o	f	f	o	o	...	...
MYRTACEÆ.									
Eucalyptus									
muelleri, Moore	...	f	o	f	f	...	...	...	...
vernicosa, Hook.	...	...	...	...	r	...	...	...	...
gunnii, Hook. f.	...	r	...	...	...	...	...	...	...
coccifera, Hook.	...	l	o	l	l	...	...	...	...
amygdalina, Lab.	...	...	...	...	...	...	r	...	...
Leptospermum									
myrtifolium, Sieb.	...	...	...	o	f	o	...	...	f
lanigerum, Sm. *var. montanum*	o	o	o	o	o	...	...	...	...
scoparium, R. & G. Forst.	...	o	o	...	f	r	r	...	o
rupestre, Hook.	...	...	...	o	o	...	...	...	o
Melaleuca squamea, Lab.	...	...	f	f	ld	f	...	...	f
Bæckea leptocaulis, Hook.	...	f	f	f	ld	r	...	...	f
CUNONIACEÆ.									
Anodopetalum biglandulosum, Cunn.	...	...	f	...	...	...	...	...	...
EUCRYPHIACEÆ.									
Eucryphia billardieri, Spach.	...	...	o	r	...	...	...	...	...
ROSACEÆ.									
Rubus gunnianus, Hook.	...	o	...	o	o	f	f	...	o
Acæna sanguisorba, Vahl. *v. montana*	...	...	...	...	...	...	o	...	...
Acæna sanguisorba (type)	...	...	...	...	...	...	o	...	...
LEGUMINOSÆ.									
Oxylobium ellipticum, R. Br.	...	f	f	f	ld	o	...	...	f
Pultenæa									
subumbellata, Hook.	...	...	...	...	f	o	f	...	...
juniperina, Lab.	...	...	...	...	r	...	...	...	...
Bossiæa cordigera, Benth.	...	...	...	...	o	o	r	...	...
Acacia mucronata, Willd.	...	...	o	o	...	...	...	...	r
GERANIACEÆ.									
Geranium									
dissectum, L.	...	...	...	...	...	...	f	...	o
sessiliflorum, Cav.	...	...	...	...	...	...	o	...	...
Pelargonium australe, Willd.	...	...	...	...	r	...	...	...	...
OXALIDACEÆ.									
Oxalis magellanica, G. Forst.	o	o	o	o	...	r	r	...	o
RUTACEÆ.									
Boronia									
citriodora, Hook.	...	...	...	f	ld	o	...	...	f
rhomboidea, Hook.	...	...	...	f	ld	o	...	...	o
polygalifolia, Sm.	...	...	...	...	r	r	...	...	...
Eriostemon oldfieldii, F. v. M.	...	...	...	...	r	...	...	...	...
Phebalium billardieri, A. Juss.	...	...	...	...	r	...	...	...	...

	FOREST. a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
TREMANDRACEÆ.									
Tetratheca pilosa, Lab.	...	...	...	...	o	r	...	...	...
POLYGALACEÆ.									
Comesperma retusum, Lab.	...	...	...	...	o	f	...	...	...
ELÆOCARPACEÆ.									
Aristotelia peduncularis, Hook.	...	...	r	...	...	...	...	...	...
DILLENIACEÆ.									
Hibbertia procumbens, DC.	...	f	...	a	a	o	o	...	r
GUTTIFERÆ.									
Hypericum japonicum, Thunb.	...	...	...	...	...	...	...	...	o
VIOLACEÆ.									
Viola hederacea, Lab., *var. Sieberi*	...	...	...	...	...	o	f	...	...
THYMELÆACEÆ.									
Drapetes tasmanica, Hook.	...	...	...	...	r	...	...	...	r
Pimelea									
linifolia, Sm.	...	o	o	...	o	o	r	...	...
sericea, R. Br.	...	...	...	o	...	...	...	...	...
ŒNOTHERACEÆ.									
Epilobium									
billardierianum, Sm.	...	...	...	...	...	...	...	o	r
alpinum, L.	...	...	...	...	...	...	...	...	r
glabellum, G. Forst.	...	...	...	...	...	...	r	...	...
junceum, G. Forst.	...	...	...	...	...	...	...	r	...
Œnothera tasmanica, Hook.	...	...	...	...	...	...	...	vr	...
HALORRHAGIDACEÆ.									
Halorrhagis									
depressa, Walp.	...	...	...	...	...	...	f	...	...
tetragyna (Lab.), Hook. f.	...	o	...	...	...	...	o	...	...
micrantha (Thunb.), R. Br.	...	...	...	...	...	f	f	...	...
Myriophyllum pedunculatum, Hook. f.	...	...	...	...	...	...	...	r	...
Gunnera cordifolia, Hook.	...	...	...	...	...	...	...	o	...
UMBELLIFERÆ.									
Hydrocotyle hirta, R. Br.	...	...	...	...	...	o	f	o	o
Actinotus									
bellidioides, Benth.	...	...	...	...	f	f	f	o	...
suffocata, Rod.	...	...	...	...	f	f	f	o	r
moorei, Rod.	...	o	...	...	...	...	r	r	r
Dichosciadium ranunculaceum (F. v. M.), Domin.	...	...	...	...	...	...	...	...	f
Diplaspis cordifolia, Hook.	o	...	...	...	...	...	...	o	f
Oreomyrrhis andicola, Endl.	...	...	...	...	...	...	...	...	o
var. argentea, Hook.	...	...	...	...	...	...	...	...	r
Aciphylla procumbens, F. v. M.	...	...	...	...	...	...	...	...	o
Daucus brachiatus, Sieb.	...	...	...	...	...	...	r	...	...
Xanthosia dissecta, Hook. f.	...	...	...	...	...	...	f	r	...

	FOREST. a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
ERICACEÆ.									
Gaultheria									
hispida, R. Br.	...	r	o	o	...	...	...	...	...
antipoda, Forst.	...	...	...	...	...	...	...	...	o*
Pernettya tasmanica, Hook.	...	...	...	...	...	...	...	...	r*
EPACRIDACEÆ.									
Pentachondra pumila, R. Br.	...	...	...	...	...	f	...	...	f
Trochocarpa									
disticha, Spreng.	...	o	...	...	...	...	...	...	...
thymifolia, Spreng.	...	o	o	o	...	...	...	...	...
gunnii, Benth.	f	o	f	...	...	...	...	...	...
Cyathodes									
dealbata, R. Br.	...	...	...	...	...	...	...	...	f
straminea, R. Br.	...	...	...	f	...	...	...	...	f
adscendens, Hook.	...	...	...	...	...	...	...	...	f
acerosa, R. Br.	...	f	f	f	f	...	...	...	o
Lissanthe montana, R. Br.	...	f	o	f	...	...	r	...	o
Leucopogon									
collinus, R. Br.	...	f	o	f	...	...	...	...	o
ericoides, R. Br.	...	f	o	f	...	...	...	...	o
milligani, Rod.	...	...	...	...	...	...	...	...	o
Monotoca									
scoparia, R. Br.	...	...	r	...	r	...	...	...	...
empetrifolia, R. Br.	...	...	...	...	...	...	...	...	...
Archeria									
eriocarpa, Hook.	a	o	a	...	...	...	...	...	...
serpillifolia, Hook.	...	...	o	...	o	...	...	...	o
hirtella, Hook.	...	...	...	...	...	...	...	...	r
Prionotes cerinthoides, R. Br.	...	...	...	...	...	...	...	...	...†
Sprengelia incarnata, Sm.	...	o	o	f	f	f	o	...	f
Dracophyllum minimum, Hook.	...	...	...	...	...	...	...	...	l d
Epacris									
exserta, R. Br.	...	...	...	...	...	...	...	...	r
impressa, Lab., *v. ruscifolia*	...	...	...	...	f	...	...	...	...
lanuginosa, Lab.	...	f	o	f	f	...	...	...	...
microphylla, R. Br.	...	f	o	f	f	...	...	...	...
serpyllifolia, R. Br.	...	...	o	f	f	o	...	...	...
heteronema, Lab.	...	...	...	...	...	...	...	...	...
myrtifolia, Lab.	...	...	...	...	o	...	...	...	r
Richea									
sprengelioides, F. v. M.	o	o	o	f	o	...	...	...	f
acerosa, F. v. M.	...	...	...	...	...	...	...	...	o
gunnii, Hook.	...	...	...	...	...	o	...	...	...
scoparia, Hook.	f	f	a	a	o	...	...	...	a
dracophylla, R. Br.	...	r	...	...	...	...	...	...	...
pandanifolia, Hook.	f	f	f	f	o	...	...	...	r
LOGANIACEÆ.									
Mitrasacme									
montana, Hook.	...	...	...	...	f	...	o	...	o
archeri, Hook. f.	...	...	...	...	...	...	...	...	f

*Also in New Zealand.

†Tr. R.S. Tas., 1887.

	FOREST. a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
GENTIANACEÆ.									
Gentiana montana, Forst.	...	...	...	...	o	o	f	o	f
SCROPHULARIACEÆ.									
Gratiola nana, Benth.	...	...	...	...	...	...	o	...	...
Veronica									
gracilis, R. Br.	...	...	...	...	...	...	o	...	...
nivea, Lindl.	...	...	...	...	...	...	...	...	o
calycina, R. Br.	...	r	...	...	...	...	r	...	...
Euphrasia									
cuspidata, Hook.	...	...	...	...	f	...	f	...	o
collina, R. Br.	...	...	...	f	f	...	o	...	f
Ourisia integrifolia, R. Br.	...	...	...	...	...	...	...	...	r
LENTIBULARIACEÆ.									
Utricularia dichotoma, Lab.	...	...	...	...	...	o	...	o	...
PLANTAGINACEÆ.									
Plantago									
brownii, Rapp.	...	...	...	...	r	r	r	...	o
tasmanica, Hook. f.	...	...	...	...	r	r	r	...	o
gunnii, H.	...	...	...	...	...	...	...	...	r
varia, R. Br.	...	...	...	...	...	...	r	...	...
RUBIACEÆ.									
Coprosma									
moorei, Rod.	...	r	...	...	...	r	r	...	...
nitida, Hook. f.	...	o	...	f	f	...	...	...	f
billardieri, Hook.	...	...	...	...	...	...	...	...	...
repens, Hook. f.	...	...	...	...	...	...	...	...	o
Asperula oligantha, F. v. M.	...	o	...	...	...	o	o	...	...
CAMPANULACEÆ.									
Wahlenbergia									
gracilis, A. DC.	...	...	...	...	...	o	o	...	...
saxicola, A. DC.	...	...	...	...	...	...	...	...	r
STYLIDIACEÆ.									
Stylidium graminifolium, Swartz.	...	f	o	a	a	o	o	...	f
Forstera bellidifolia, Hook.	...	...	...	...	...	...	...	r	...†
Donatia novæ-zelandiæ, Hook.	...	...	...	...	...	...	...	...	ld*
GOODENIACEÆ.									
Scævola hookeri, F. v. M.	...	...	...	...	o	f	o	...	...
COMPOSITÆ.									
Olearia									
persoonioides, Benth.	...	...	o	o	r	...	...	...	...
myrsinoides, F. v. M.	...	r	...	...	...	...	r	...	...
obcordata, Benth.	...	...	...	o	o	...	...	o	...
floribunda, Benth.	...	...	...	...	...	...	r	...	...
pinifolia, Benth.	o	f	o	o	...	...	...	o	o
stellulata, DC.	...	...	...	...	...	...	o	...	...
ledifolia, Benth.	...	...	...	r	...	...	...	...	f

*Lakeside

	FOREST. a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
Celmisia longifolia, Cass.	...	f	o	f	o	o	a	...	f
var. saxifraga	...	...	...	...	...	...	...	...	f
Erigeron pappochroma, Lab.	...	...	...	...	...	r	f	...	f
Lagenophora billardieri, DC., *v. montana*	...	f	...	...	...	o	f	...	r
Brachycome									
scapiformis, DC.	...	...	...	...	...	...	o	...	...
stricta, DC.	...	...	...	...	...	...	o	...	...
cardiocarpa, F. v. M.	...	...	...	...	...	...	...	r	...
Cotula									
alpina, Hook. f.	...	...	...	...	...	...	...	...	o
reptans, Benth.	...	...	...	...	...	...	...	...	o
australis, Hook. f.	...	...	...	...	...	...	o	...	o
Abrotanella scapigera, F. v. M.	...	...	...	...	...	o	...	...	f
Craspedia richea, Cass.	...	...	...	...	...	...	o	...	...
Podolepis acuminata, R. Br.	...	...	...	...	...	...	o	...	...
Leptorrhynchus squamatus, Less.	...	...	...	...	...	...	o	...	...
Helipterum incanum, DC.	...	...	...	...	...	...	r	...	...
Helichrysum									
lucidum, Henck.	...	...	...	...	...	r	a	...	r
var. albidum, DC.	...	...	...	...	...	...	...	...	r
leucopsidium, DC.	...	...	...	...	...	...	r	...	r
milligani, Hook.	...	...	...	...	...	...	...	...	a
pumilum, Hook.	...	...	...	...	...	o	...	...	a
scorpioides, Lab.	...	...	...	...	...	o	o	...	...
Oxothamnus									
ledifolius, Hook.	...	...	...	f	o	...	...	...	a
thyrsoideus, DC.	...	...	...	...	r	...	...	...	...
backhousii, Hook. f.	...	...	...	o	o	...	...	...	o
obcordatus, DC.	...	...	...	...	o	...	...	...	...
hookeri, Hook.	...	...	...	o	...	...	o	o	...
gunnii, Hook.	...	...	...	...	...	r	...	...	...
Gnaphalium									
alpigineum, F. v. M.	...	...	...	o	...	...	...	...	o
japonicum, Thunb.	...	...	...	...	...	...	o	...	...
Pterygopappus lawrencii, Hook.	...	...	...	...	...	...	...	...	a
Ewartia									
planchoni (Hook.), Beauv.	...	...	...	...	...	...	...	...	r
meredithæ (F. v. M.), Beauv.	...	...	...	...	...	...	...	...	ld
Senecio									
pectinatus, DC.	...	...	...	...	...	...	...	...	a
var. ochroleuca	...	...	...	...	...	...	...	...	f
var. leptocarpus	...	f	f	...	...	...	...	...	...
Erechtites prenanthoides, DC.	...	...	...	...	...	...	r	...	...
Microseris scapigera (Forst.), Sch.	...	...	...	...	...	...	o	...	...

a abundant. f frequent. o occasional. r rare. vr very rare.

d dominant. ld locally dominant.

MOSSES.

Dicraneæ.

Dicranium
billardieri, Schw.
pungens, J. Hook.
Ceratodon purpureus, Bridel.

Grimmieæ.

Grimmia symphyodon.

Orthotricheæ.

Orthotrichum luteum, Mitt.
Macromitrium aurescens, Hampe.
Orthodontium sulcatum, Hook.

Bartramieæ.

Bartramia halleriana, Hedwig.
Conostomum pusillum, J. Hook.

Bryeæ.

Bryum binium, Schreber.
Leptostomum inclinans, R. Br.
Rhizogonium novæ-hollandiæ, Bridel.
Leptobryum pyriforme, Hedwig.

Hookerieæ.

Hookeria obscura, Mitt. (?)

Neckereæ.

Ptychomnion aciculare, Lab.

Hypneæ.

Hypnodendron comosum, Lab.
Hypnum
cupressiforme, C. Muell.
crinitum, Hook.

Polytricheæ.

Polytrichum commune, L.

Sphagneæ.

Sphagnum australe, Mitt.
Braunia humboldtii, Schimp.

HEPATICS.

Sendtnera scolopendra, Nees.
Polyotis magellanicus, Gottsche.
Plascochila annitina, Lindley.
Marchantia polymorpha, L.

Lepidozia
pendulina, Nees.
lævifolia, P. Taylor.
Leperoma scolopendra, Nees.
Jungermannia colorata, Lehmann.
Chaloscyphos
cymbuliferus.
tridentatus, Mitt.
Gollschea pinnatifolia, Nees.

LICHENS.

Sphærophoron corallioides, Pers.
Cladonia
retipora, Floecke.
fimbriata, Schoerer.
macilenta, Hoffman.
coccifera.
delicatula.
leptophylla.
Stereocaulon proximum, Nylander.
Usnea barbata, Acharius.
Sticta
freycinetii, Delise.
billardieri.
Parmelia
pertusa.
tiliacea, Ach.
Lecidea geographica, Sch.

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AN ORIGINAL AND INDEPENDENT METHOD OF EXTRACTING ROOTS OF NUMBERS.

By

A. E. BLACKMAN.

(Read 12th November, 1928.)

Let us look at these three formulæ:—

$$\frac{1}{R}\left\{(R-1)\,N+\frac{\mathbf{N}}{N^{R-1}}\right\} \quad \ldots\ldots\ldots \quad A$$

$$\left\{N^{R-1} \times \frac{\mathbf{N}}{N^{R-1}}\right\}^{\frac{1}{R}} \quad \ldots\ldots\ldots \quad B$$

$$\frac{1}{R}\left(N-\frac{\mathbf{N}}{N^{R-1}}\right) \quad \ldots\ldots\ldots \quad C$$

Where R is the degree of the root sought, $\mathbf{N}$ is the number whose root is required and N is conveniently the nearest known number greater than the root.

Let us refer to them as A, B, and C respectively to save space.

A is the arithmetical mean of the same quantities of which B is the geometrical mean, and therefore A is greater than B, but B is the root we require; A is also less than N because a mean is less than the greater of the extremes, therefore A is nearer the root than N.

By using the formula A again, putting the value of A in the place of N, we get another value for A still nearer the root and so on *ad infinitum*.

The difference between N and A is C, which does not vanish, while N is not the root, so that we by repeating the process can get a value for A as near the root as we please.

Further! We always know whether we have chosen our value for N correctly, i.e., greater than the root, because otherwise the value of C becomes negative.

Let us take the following example of the method, where the labour of the work is also shewn to be capable of considerable reduction by cutting off end figures, etc.

To get the fifth root of seventeen. Taking 2, which is evidently too great to start with, we have by formula A

$$\frac{1}{5}\left\{4 \times 2 + \frac{17}{2^4}\right\} = \frac{29}{16}$$

Taking off 2 from the numerator and 1 from the denominator slightly lessens the value of the above fraction, but makes it more workable by reducing it to $\frac{9}{5}$, which we can again use in the formula A in decimal form, thus,—

$$\frac{1}{5}\left\{4 \times 1{\cdot}8 + \frac{17}{(1{\cdot}8)^4}\right\}$$

$$= \frac{1}{5}\left\{7{\cdot}2 + \frac{17}{10{\cdot}4976}\right\}$$

We can alter this to

$$\frac{1}{5}\left\{7{\cdot}2 + \frac{17}{10{\cdot}5}\right\}$$

without much risk of getting a value too small, and then this is equal to

$$1{\cdot}7638\ \ldots\ldots$$

Let us make a trial with

$$1{\cdot}763$$

If it should be too small the next number will be greater instead of less, because by the general difference formula C, the difference will be negative.

With this number, formula A gives us,

$$\frac{1}{5}\left\{4\times 1{\cdot}763+\frac{17}{(1{\cdot}763)^4}\right\}$$

$$=1{\cdot}76234084128\ \ldots\ldots$$

Correct to six places of decimals and perhaps more, as shown by noticing the decimal place of the first significant figure in the last difference, i.e.,

$$\begin{array}{l} 1{\cdot}763 \\ 1{\cdot}76234084128\ldots \\ \hline 1{\cdot}00065915871\ \ldots \end{array}$$

In general we can rely upon twice the number of places of decimals as the decimal place of the last cipher in the last difference, which in this case is 3.

The total value of A is too great as all values found this way must be, but the number above with no more figures may even be too small; as a rule, if we stop short according the rule stated, we get a value too small.

In reality the value is correct up to the first place, which makes it too great.

THE ROYAL SOCIETY OF TASMANIA

ABSTRACT OF PROCEEDINGS

1928.

12th MARCH, 1928.

Annual Meeting.

The Annual Meeting was held on Monday, 12th March, at the Society's Rooms, Tasmanian Museum, Hobart, Dr. A. H. Clarke presiding. The Annual Report and Statement of Accounts were read and adopted. The following were elected members of the Council for 1928:—Dr. A. H. Clarke, Dr. W. L. Crowther, Mr. W. H. Clemes, Major L. F. Giblin, Mr. J. A. Johnson, Mr. A. N. Lewis, Mr. J. Reynolds, Mr. L. Rodway, Mr. E. E. Unwin, and Mr. C. E. Lord (*ex officio*).

Mr. Walter E. Taylor was elected Honorary Auditor. In announcing the election the Chairman, on behalf of the Society expressed thanks to Mr. Taylor for the work he had done during the past year.

The following were elected members of the Society:—Messrs. Henry Allport, C. D. Cuthbert, E. R. Hudson, J. D. McElroy, R. Scott, J. W. Weston, Dr. A. Nelson, and Mrs. C. D. Cuthbert.

Papers.

The following papers were read:—

"Some Remarkable Annelid Remains from Arthur River, North-Western Tasmania." By Frederick Chapman, A.L.S., F.G.S.

"Tasmanian Marine Algæ." By Professor A. H. S. Lucas, M.A., B.Sc.

Presentation of the Royal Society Medal.

The Chairman presented to Mr. L. Rodway, C.M.G., the first Royal Society of Tasmania Medal, which was established in accordance with resolution passed at the meeting of the Society held on the 9th May, 1927. In making the presenta-

tion, the Chairman remarked that Mr. L. Rodway had been originally trained for the sea and served full time on the Thames Marine Officers' Training Ship *Worcester* passed out with a double first-class extra certificate, a position very seldom obtained, and passed under steam for the Royal Navy under Captain Saxby, and was three years midshipman in the George Marshall service.

Having left the sea and gained the Licentiateship of the Royal College of Surgeons of London, Mr. Rodway arrived in Tasmania in 1880, and joined the Royal Society of Tasmania four years later. He had always been a prominent member, and had been a member of the Council since 1911, at one time holding the position of Chairman and since 1921 had been Senior Vice-President of the Society, and was a Trustee of the Tasmanian Museum and Art Gallery and of the Botanical Gardens. He was appointed Honorary Government Botanist by Sir Edward Braddon in 1896, a position he had held ever since, and it was in the field of Botany that Mr. Rodway had performed such outstanding work on behalf of the State; but he had done meritorious work of a civic and scientific nature generally. For instance, he was for many years a member and sometime Vice-Chairman of the Technical School, and for thirty odd years was on the staff of the General Hospital as Honorary Dentist. He performed splendid work for many years as a member of the Domain Improvement Committee, he was Chairman of the National Park Board, and for many years Chairman of the Tasmanian Field Naturalists' Club, he was President of the Sandy Bay Rowing Club and the Tasmanian Branch of the Royal Life-Saving Society, and was prominent in the University Extension Lectures and the Workers' Educational Association. He was a member of the Scenery Preservation Board and was also Advisory Officer to the Forestry Department, and for some years lecturer in Botany to the University.

Mr. Rodway had received the Clarke Memorial Medal of the Royal Society of New South Wales for his researches in Botany, and, in addition to his many papers contributed to the Royal Society of Tasmania, he had found time to compile a comprehensive work on "The Flora of Tasmania," as well as smaller handbooks on "The Wild Flowers of Tasmania," and a complete description of the Mosses and Hepatics of the State.

Mr. Rodway's work had been recognised by His Majesty the King, who had been pleased to confer an order upon him.

L. Rodway, C.M.G.

Other members having endorsed the Chairman's remarks, Mr. Rodway returned thanks for the honour conferred upon him by the Society.

Lecture.

Messrs. Clive Lord and A. McIntosh Reid delivered an illustrated lecture on "The South Coast of Tasmania." During the course of the lecture Mr. Reid referred to the probable extension of tin-mining operations at Port Davey, and also exhibited specimens of fossil organic remains which had been discovered in the Pre-Cambrian schists of the Port Davey region—the species had yet to be determined.

16th APRIL, 1928.

The Monthly Meeting was held at the Society's Rooms, the Tasmanian Museum, Dr. A. H. Clarke presiding.

The following members were elected:—Messrs. H. Buchanan, J. C. Foley, C. Holland, R. Steele, B. Tribolet, and Miss Joi Chapman.

Lecture.

Mr. P. B. Nye delivered an illustrated lecture on "The Geology of the South-Western Tasmania."

14th MAY, 1928.

The Monthly Meeting was held at the Society's Rooms, the Tasmanian Museum, on the 14th May, Dr. A. H. Clarke presiding.

The following were elected members of the Society:—Mrs. E. Brettingham-Moore, Mr. L. Norman.

Paper.

The following paper was read:—

"The Parasitism of *Exocarpus humifusa*, R. Br."
By D. A. Herbert, M.Sc.

Lecture.

Mr. E. E. Unwin, M.Sc., delivered an illustrated lecture on "Animal Flight." An interesting discussion took place at the conclusion of the meeting.

11th JUNE, 1928.

The Monthly Meeting was held at the Society's Rooms, the Tasmanian Museum, Dr. A. H. Clarke presiding.

The following members were elected:—Miss I. Gunn, Mr. R. Morris.

Colonel W. W. Giblin, C.B., V.D., M.R.C.S., L.R.C.P., delivered an illustrated lecture on "The Great Barrier Reef."

Paper.

The following paper was read:—

"Notes on the Genus *Poria*." By J. B. Cleland, M.D., and L. Rodway, C.M.G.

9th JULY, 1928.

The Monthly Meeting was held at the Society's Rooms, the Tasmanian Museum, Mr. A. N. Lewis presiding.

Mr. J. C. Breaden delivered an illustrated lecture on "Tasmanian Wild Flowers." Arising out of the discussion which took place at the conclusion of the meeting, it was resolved to communicate with the City Council, and draw attention to the need for more supervision being given to the Domain, as many of the trees were being destroyed. It was also resolved to point out the advisability of planting native trees on the Domain.

9th JULY, 1928.

A Special General Meeting of the Society was held at the Society's Rooms, Tasmanian Museum.

Upon the recommendation of the Council, moved by Mr. A. N. Lewis, Rule 6 was amended as follows:—

6. (a) At the next General Meeting after any such nomination as provided for in Rule 5 has been received by the Secretary, the name of the proposed candidate and of his proposers shall be read to the Meeting, and it shall be intimated that the election shall take place at the next General Meeting.

(b) At any time within 14 days of such intimation any five members may, by requisition in writing addressed to the Council and left with the Secretary,

require that the election shall be by ballot, and at any time prior to the election the Council may direct that the election shall be by ballot.

(c) If any such requisition is received or direction given, the Secretary shall forthwith notify the proposers of the candidate in writing, and the notices convening the General Meeting at which the election is to be held shall notify the name of the candidate and the fact that a ballot is to be taken on the question of his election. The following procedure shall be adopted at the election:—

(1) Each member present and entitled to vote will be handed a ballot paper on which the name of the candidate has been written or printed, together with an appropriate place for indication of the vote.

(2) The ballot shall be conducted secretly, and the Chairman shall appoint two members to be Scrutineers. The Scrutineers shall count the votes and report the result.

(3) The Chairman shall declare the result, and if three-fourths of the members present and voting shall vote in favour of his election, the Chairman shall declare the candidate to be elected.

(d) In the event of no such requisition being received or direction being given the election of the candidate shall take place at the meeting for which the intimation referred to in Sub-clause (a) hereof was given. At that meeting the Chairman shall put the question of the election to the Candidate, and members present and entitled to vote shall vote thereon by the voices. In the event of the Chairman not being able to decide on the vote by the voices, or on the request of any member, the vote shall be confirmed by a show of hands. The Chairman shall forthwith declare the result of the election, and if a majority of members present, and voting, vote in favour of the Candidate's election, the Chairman shall declare him to be elected.

(e) No person may be proposed as a candidate for election who has been defeated in an election during the twelve months previous to his proposal.

13th AUGUST, 1928.

The Monthly Meeting was held at the Society's Rooms, Dr. A. H. Clarke presiding.

Paper.

The following paper was read:—

"R. M. Johnston's Memoranda relating to the Fishes of Tasmania." By G. P. Whitley.

Lecture.

Mr. R. W. Legge delivered an illustrated lecture on "The Native Tribes of the Lake Eyre District."

10th SEPTEMBER, 1928.

The Monthly Meeting was held at the Society's Rooms, Dr. A. H. Clarke presiding.

Mr. F. B. Richardson, M.A., was elected a member.

Botanical Section.

Mr. A. V. Giblin spoke concerning the need for the establishment of a Botanical Section, and moved that a Botanical Section be formed. This was seconded by Mr. L. Rodway, and carried.

Lecture.

Mr. E. Ashby, of Adelaide, delivered an illustrated lecture on Chitons.

8th OCTOBER, 1928.

The Monthly Meeting was held at the Society's Rooms, Dr. A. H. Clarke presiding.

The following members were elected:—Rev. W. Walters, Mr. D. Avery.

Paper.

The following paper was read:—

"Tasmanian Graptolite Record." By R. A. Keble.

Lecture.

Dr. W. L. Crowther delivered an illustrated lecture on "Early Tasmanian Whaling," and an interesting discussion took place at the conclusion of the lecture. The exhibits in-

cluded a very extensive collection of whaling weapons, models of vessels, etc., and the Chairman directed special attention to the collection of whaling material presented to the Tasmanian Museum collection by Messrs. R. R. Rex and Son and Messrs. J. Forsyth and Son.

12th NOVEMBER, 1928.

The Monthly Meeting was held at the Society's Rooms, Dr. A. H. Clarke presiding.

Papers.

The following papers were read:—

1. "Note on *Gautieria* in Tasmania." By L. Rodway, C.M.G.
2. "Notes on the Genus *Poria* (No. II.)." By L. Rodway and J. B. Cleland, M.D.
3. "The Inheritance of Sex in an abnormal Wallflower." By A. Nelson, Ph.D.
4. "On Some Diminutive Types of Tasmanian Stone Implements." By R. W. Legge.
5. "Notes on the Stone Culture of Central Australia." By G. Aiston.
6. "Notes on Tasmanian Crania." By W. L. Crowther, M.B.
7. "State of the Federation Movement in Tasmania, 1825-1900." By J. Reynolds.
8. "Notes on the Sea Elephant." By H. H. Scott and C. E. Lord.
9. "A Method of Extracting Roots of Numbers." By A. E. Blackman.
10. "Studies in Tasmanian Spiders, Part III." By V. V. Hickman, B.A., B.Sc.
11. "The Botany of Cradle Mountain." By C. S. Sutton, M.B.

At the conclusion of the meeting the Chairman drew attention to the fact that no less than eleven papers had been read that evening, and he could recollect no other occasion when so many papers had been read in one evening before the Society.

ANNUAL REPORT

1928.

THE ROYAL SOCIETY OF TASMANIA

Patron:

HIS MAJESTY THE KING.

President:

HIS EXCELLENCY SIR JAMES O'GRADY, K.C.M.G.

Vice-Presidents:

L. RODWAY, C.M.G.
A. H. CLARKE, M.R.C.S., L.R.C.P.

Council.
(Elected March, 1928)

A. H. CLARKE, M.R.C.S., L.R.C.P. (Chairman)
W. H. CLEMES, B.A., B.Sc.
W. E. L. CROWTHER, D.S.O., M.B.
L. F. GIBLIN, D.S.O.
J. A. JOHNSON, M.A.
A. N. LEWIS, M.C., LL.M.
CLIVE LORD, F.L.S.
J. REYNOLDS
L. RODWAY, C.M.G.
E. E. UNWIN, M.Sc.

Standing Committee:

L. F. GIBLIN, E. E. UNWIN, C. LORD.

Hon. Treasurer:

W. E. L. CROWTHER, D.S.O., M.B.

Editor:

CLIVE LORD, F.L.S.

Auditor:

WALTER E. TAYLOR, F.F.I.A., F.I.A.S.

Secretary and Librarian:

CLIVE LORD, F.L.S.

LIST OF MEMBERS

Honorary Members:

David, Sir T. W. Edgeworth, K.B.E., C.M.G., B.A., F.R.S., F.G.S., Emeritus Professor of Geology and Physical Geography in the University of Sydney. "Coringah," Sherbroke Road, Hornsby, N.S.W.

Mawson, Sir Douglas, Kt., O.B.E., B.E., D.Sc., F.R.S. Professor of Geology and Mineralogy, the University, Adelaide.

Spencer, Sir William Baldwin, K.C.M.G., M.A., D.Sc., Litt.D., F.R.S. Melbourne.

Wood-Jones, Professor F., M.B., D.S., M.R.C.S., L.R.C.P., D.Sc., F.R.S. The University, Honolulu, Hawaii.

Corresponding Members:

Year of Election.

1901 Benham, W. B., M.A., D.Sc., F.R.S., F.Z.S. Professor of Biology, University of Otago, Dunedin, N.Z.

1892 Bragg, Sir W. H., M.A., F.R.S. Director of the Royal Institution, Albemarle Street, London.

1901 Chapman, Professor R. W., M.A., B.C.E. The University, Adelaide.

1923 Pulleine, R., M.B. 163 North Terrace, Adelaide.

1902 Smith, R. G., D.Sc. Linnean Hall, Linnean Society of N.S.W., 16 College Street, Sydney.

1892 Thomson, Hon. G. M., M.L.C., F.L.S. 99 Eglinton Road, Dunedin, N.Z.

1901 Wall, Professor A., M.A. Canterbury College, Christchurch, N.Z.

Life Members:

1918 Avery, J. 52 Southerland Road, Annadale, Melbourne.

1908 Baker, H. D. American Consular Service, Washington.

1890 Foster, Lieutenant-Colonel Henry. "Merton Vale," Campbell Town.

1905 Grant, C. W. "High Peak," Huon Road.

1894 Mitchell, J. G. Parliament Street, Sandy Bay.

1896 Sprott, G., M.D. Town Hall, Hobart.

Members:

Year of Election.

1921 Anderson, G. M., M.D., C.M. Clare Street, New Town.

1923 Agnew, Miss K. Augusta Road, New Town.

1921 Allen, D. V., B.Sc. Launceston Technical School, Launceston.

1924 Allen, F. A. 13 Franklin Street, West Hobart.

1928 Allport, Henry. 111 Macquarie Street, Hobart.

1925 Ashbolt, Sir Alfred. "Lenna," Battery Point.

1926 Atkins, C. N., M.B., B.S., D.P.H. 145 Macquarie Street, Hobart.

1927 Atkinson, T. H. Department of Agriculture, 90 Cameron Street, Launceston.

1928 Avery, David. Geeveston, Tasmania.

1921 Baker, Hon. H. S., LL.M., D.S.O. Messrs. Finlay, Watchorn, Baker, and Turner, Murray Street, Hobart.

1887 Barclay, D. 143 Hampden Road, Hobart.

1927 Barnes, G. L. C/o Messrs. Giblin and Piesse, Hobart.

1921 Barr, J. Stoddart, M.D. (Glasgow). Lower Sandy Bay.

1926 Barrett, Rev. W. R. Cressy, Tasmania.

1890 Beattie, J. W. 28 Jordan Hill Road, Hobart.

1918 Bellamy, H., J.P., M.Am.Soc. C.E., M.I.Mech.E., F.R. San. I. Government Hydraulic Engineer, Adelaide.

1924 Bennett, H. W., L.D.S., D.D.S. Brisbane Street, Launceston.

1903 Bennett, William H. Ashby, Ross.

1909 Blackman, A. E. 26 Warwick Street, Hobart.

1920 Blaikie, T. W. Practising School, Elizabeth Street, Hobart.

1927 Blake, Frank. Red Chapel Road, Lower Sandy Bay.

1918 Bowling, J. "Barrington," Tower Road, New Town.

1924 Booth, N. P. Messrs. Cadbury-Fry-Pascall Pty. Ltd., Claremont.

1925 Bowerman, Captain. Marine Board, Hobart.

1923 Breaden, J. C. Waverley Avenue, New Town.

1923 Brett, R. G. 53a Hill Street, Hobart.

1917 Brettingham-Moore, E., M.B., Ch.M. Macquarie Street, Hobart.

1928 Brettingham-Moore, Mrs. E. Macquarie Street, Hobart.

Year of Election.

1925 Brigden, Professor J. B., B.A. Professor of Economics, Tasmanian University, Hobart.
1911 Brooks, G. V. Director of Education, Hobart.
1922 Brownell, C. C. 117 Hampden Road, Battery Point.
1907 Brownell, F. L. "Berwyn," Mercer Street, New Town.
1928 Buchanan, Howard. E.S. & A. Bank, Hobart.
1924 Budge, E. A., B.Sc. 302 Argyle Street, Hobart.
1919 Burbury, Charles. "Brookside," Moonah.
1918 Burbury, Frederick. "Holly Park," Parattah.
1927 Butcher, M. G. 103 York Street, Sandy Bay.
1925 Butler, A. L. Lower Sandy Bay.
1923 Butler, Mrs. G. H. 30 Augusta Road, New Town.
1909 Butler, W. F. D., B.A., M.Sc., LL.B. Bishop Street, New Town.
1924 Calver, C. W. 112 Brisbane Street, Launceston.
1920 Cane, F. B. 90 High Street, Sandy Bay.
1928 Chapman, Miss Joi. 212 Davey Street, Hobart.
1927 Cherry, P. J. Burnie.
1913 Chepmell, C. H. D. Clerk of the Legislative Council, Hobart.
1920 Clark, W. I., M.B. Macquarie Street, Hobart.
1896 Clarke, A. H., M.R.C.S., L.R.C.P. Domain Cottage, The Domain, Hobart.
1918 Clarke, T. W. H. "Quorn Hall," Campbell Town.
1910 Clemes, W. H., B.A., B.Sc. Clemes College, Hobart.
1922 Collier, J. D. A. The Librarian, Tasmanian Public Library, Hobart.
1925 Coogan, W. Lord Street, Sandy Bay, Hobart.
1927 Cooper, S. G. 5 Main Road, New Town.
1928 Cranstoun, Mrs. 6 Gregory Street, Sandy Bay.
1911 Crowther, W. L., D.S.O., M.B. Macquarie Street, Hobart.
1917 Cullen, Rev. John. Macquarie Street, Hobart.
1918 Cummins, W. H., A.I.A.C. Manager, *The Mercury* Office, Hobart.
1928 Cuthbert, C. D. "Wystoun Eaves," Ethelmont Estate, Sandy Bay.
1928 Cuthbert, Mrs. C. D. "Wystoun Eaves," Ethelmont Estate, Sandy Bay.
1922 Davidson, R. Temple Chambers, Macquarie Street, Hobart.
1927 Dallas, K. M. State High School, Launceston.
1924 Davies, G. B. 111 Patrick Street, Hobart.
1919 Davies, H. Warlow. 22 Augusta Road, New Town.
1923 Davis, Alfred. High Street, Sandy Bay.

Year of Election.

1923 Davis, Charles. Red Chapel Road, Lower Sandy Bay.

1908 Dechaineux, L. Principal of the Technical College, Hobart.

1921 Dryden, M. S. 13 Hillside Crescent, Launceston.

1921 Eberhard, E. C. Charles Street, Launceston.

1919 Elliott, E. A., M.B., Ch.M. Main Road, New Town.

1921 Emmett, E. T. Director of the Tasmanian Government Tourist Bureau.

1921 Erwin, H. D. Hutchins School, Hobart.

1918 Evans, L. The Agricultural Department, Hobart.

1921 Eyre, H. Boys' Welfare School, Elizabeth Street, Hobart.

1902 Finlay, W. A. 11 Secheron Road, Hobart.

1918 Fletcher, C. E., M.A. 21 Stoke Street, New Town.

1928 Foley, J. C. Weather Bureau, Hobart.

1921 Forward, J. R. Mechanics' Institute, Launceston.

1921 Fox, Miss. Ladies' College, Launceston.

1918 Gatenby, R. L. Campbell Town.

1927 Gates, W. 41 Hunter Street, Hobart.

1927 Gellibrand, W. T. "Lachlan Vale," Ouse, Tasmania.

1927 Giblin, Dr. Arthur. Macquarie Street, Hobart.

1922 Giblin, A. V. King Street, Sandy Bay.

1908 Giblin, Major L. F., D.S.O., B.A. Bursary Buildings, Hobart.

1926 Giblin, R. W., F.R.G.S., F.R.C.I. 71 Harrington Gardens, London, S.W. 7, England.

1921 Giblin, Colonel W. W., C.B., V.D., M.R.C.S., L.R.C.P. Macquarie Street, Hobart.

1927 Gillies, C. L. Department of Agriculture, Hobart.

1923 Gorringe, J. A. Kempton, Tasmania.

1927 Grant, H. N. Tasmanian Club, Hobart.

1924 Gray, H. 93 Macquarie Street, Hobart.

1923 Green, Dr. A. W. 30 Parliament Street, Sandy Bay.

1928 Gunn, Miss Isabel. Invercarron, Broadmarsh, Tasmania.

1921 Hall, E. L. 38 Lyttleton Street, Launceston.

1922 Halligan, G. H., F.G.S. "Uplands," Station Street, Pymble, N.S.W.

1918 Harrap, Lieutenant-Colonel G. Launceston.

1919 Hay, Rt. Rev. R. S., D.D. Bishop of Tasmania, Bishopscourt, Hobart.

1924 Heritage, F. W. Collins Street, Hobart

1921 Heritage, J. E. Frederick Street, Launceston.

Year of Election.

1921 Heyward, F. J., F.R.V.I.A. 43 Lyttleton Street, Launceston.

1915 Hickman, V. V., B.A., B.Sc. Mulgrave Crescent, Launceston.

1914 Hitchcock, W. E. Storey's Creek, Avoca, Tasmania.

1918 Hogg, G. H., M.D., C.M. 37 Brisbane Street, Launceston.

1928 Holland, C. W. Agricultural Extension Service, Sorell, Tasmania.

1922 Hood, Captain F. W. Customs House, Hobart.

1928 Hudson, E. R. Department of Agriculture, Hobart.

1923 Hudspeth, W. H. "The Nook," Lower Sandy Bay.

1923 Hungerford, Mrs. "Hathaway House," Holebrook Place, Hobart.

1909 Hutchison, H. R. 1 Barrack Street, Hobart.

1922 Huxley G. H., M.A. Kent Avenue, West Hobart.

1898 Ireland, E. W. J., M.B., C.M. Macquarie Street, Hobart.

1919 Jackson, George A. 79 Collins Street, Hobart.

1906 Johnson, J. A., M.A. Training College, Hobart.

1922 Johnson, W. R. Clemes College, Hobart.

1922 Johnston, J. R. Murray Street, Hobart.

1921 Judd, W., M.A. College Street, Launceston.

1911 Keene, E. H. D., M.A. Burnie.

1922 Kemp, Andrew. Stoke Street, New Town.

1922 Kennedy, J. 96 Montpelier Road, Hobart.

1924 Kennedy, Mrs. J. 96 Montpelier Road, Hobart.

1927 King, C. S. 12 Swanston Street, New Town.

1927 Kirby, E. R. 13 Mortyn Avenue, Hobart.

1918 Knight, C. E. L., B.Sc. Claremont.

1927 Knight, F. C. E. Claremont.

1919 Knight, H. W. National Mutual Buildings, Hobart.

1913 Knight, J. C. E. Claremont.

1924 Legge, R. W. Cullenswood, Tasmania.

1919 Lewis, A. N., M.C., LL.M. "Holebrook," Holebrook Place, Hobart.

1923 Lewis, Mrs. A. N. "Holebrook," Holebrook Place, Hobart.

1887 Lewis, Sir N. E., K.C.M.G., M.A., B.C.L., LL.B. Augusta Road, New Town.

1912 Lindon, L. H. "Waimu," Canice Road, Sandy Bay.

1926 Lindon, Mrs. L. H. "Waimu," Canice Road, Sandy Bay.

1912 Lord, Clive E., F.L.S. Director of the Tasmanian Museum, Hobart.

Year of Election.

1927 Lord, Graham H. Vacuum Oil Co., Hobart.
1921 Lord, Raymond. Proctor's Road, Queenborough.
1924 Lord, Ronald. Derwentwater Avenue, Sandy Bay.
1922 Low, H. M. "The Gables," Pottery Road, New Town.
1927 McAlister, Miss M. C. Government Analyst's Department, Hobart.
1893 McAulay, Professor A., M.A. Lower Sandy Bay.
1923 McAulay, Professor A. L., Ph.D. The University, Hobart.
1921 McClinton, Dr. R. 70 St. John Street, Launceston.
1927 Mace, Miss V. E. "The Pottery," Bothwell.
1927 Macfarlane, Charles. State High School, Hobart.
1923 Macfarlane, Mrs. Charles. 3 Montagu Avenue, New Town.
1928 McElroy, J. D. 32 Bellevue Parade, New Town.
1922 Macleod, Mrs. L. H. High Street, Sandy Bay.
1919 Mackay, A. D. 26 High Street, Launceston.
1918 Mansell, A. E. 53 Collins Street, Hobart.
1924 Marsh, James. "Ingomar," Patrick Street, Hobart.
1918 Martin, Brigadier-General W. Launceston.
1921 Masters, A. H. Forest Road, Trevallyn, Launceston.
1926 Meredith, David. Electrolytic Zinc Co., Risdon.
1927 Meredith, Mrs. D. 67 High Street, Sandy Bay.
1921 Meston, A. L. Roland Street, Devonport.
1927 Mellor, David. The University, Hobart.
1909 Millen, Senator J. Roxburgh. Newstead, Launceston.
1921 Miller, R. M. State High School, Launceston.
1911 Montgomery, R. B. "Astor," Macquarie Street, Hobart.
1927 Morris, J. M. The Union Bank, Hobart.
1928 Morris, Robert J. Liverpool Street, Hobart.
1927 Murdoch, George. Macquarie Street, Hobart.
1918 Murdoch, Honourable Thomas, M.L.C. 55 Montpelier Road, Hobart.
1926 Murray, L. C. 124 Warwick Street, Hobart.
1921 Muschamp, Rev. E. Holy Trinity Rectory, Launceston.
1928 Nelson, Alexander, Ph.D., B.Sc. Superintendent of Research, Department of Agriculture, Launceston.
1925 Nettlefold, R. Macquarie Street, Hobart.
1924 Newall, A. P. Charles Street, Moonah.
1882 Nicholas, G. C. "Cawood," Ouse.
1918 Nicholls, Sir Herbert, K.C.M.G., Chief Justice of Tasmania. Pillinger Street, Sandy Bay.
1910 Nicholls, H. M. Department of Agriculture, Hobart.
1928 Norman, L. Murray Street, Hobart.

Year of Election.

1921 Nye, P. B., M.Sc., B.M.E. Geological Survey Office, Hobart.

1917 Oldham, N., J.P. Bay Road, New Town.

1921 Oldham, W. C. 39 George Street, Launceston.

1924 Oliver, H. Lindisfarne.

1927 Orme, K. "Sydney Lodge," Brisbane Street, Hobart.

1922 Overell, Miss Lilian. Holebrook Place, Hobart.

1921 Padman, R. S. 56 St. John Street, Launceston.

1923 Parker, Dr. G. M. Bellerive.

1922 Parker, H. T., M.A. "Montana," Bellerive.

1921 Patten, W. H. 59 Cameron Street, Launceston.

1923 Pedder, A. Stoke Street, New Town.

1927 Penman, C. J. Smelting Works, Launceston.

1922 Perrin, Miss K. C/o Mrs. Harner, 12 York Street, Launceston.

1902 Piesse, E. L., B.Sc., LL.B. "Merridale," Sackville Street, Kew, Melbourne.

1910 Pillinger, J. 4 Fitzroy Crescent, Hobart.

1926 Pitman, Professor E. J. G., B.A., B.Sc. The University, Hobart.

1925 Pratt, A. W. Courtney. "Athon," Mount Stuart Road, Hobart.

1927 Pratt, Rev. F. Davey Street, Hobart.

1925 Propsting, G. L. Earl Street, Sandy Bay.

1923 Purcell, G. A. Clemes College, Hobart.

1927 Raymond-Barker, A. B. Darcy Street, Hobart.

1921 Reid, A. McIntosh. Director of Mines, Hobart.

1922 Reid, A. R. Curator, Beaumaris Zoo, Domain, Hobart.

1925 Reid, Miss M. L. The University, Hobart.

1921 Reid, W. D. Public Buildings, Launceston.

1921 Reynolds, John. 25 Tower Road, New Town.

1928 Richardson, F. B., M.A. 60 Augusta Road, New Town.

1926 Rivers, Miss. The Deanery, Hobart.

1925 Robinson, F. G. 42 Regent Street, Sandy Bay.

1926 Robson, Mrs. "Elsinore," The Avenue, Elphin Road, Launceston.

1884 Rodway, L., C.M.G. 77 Federal Street, Hobart.

1921 Rolph, W. R. *Examiner* and *Courier* Office, Launceston.

1913 Ross, Hector. Cambridge, Tasmania.

1927 Russell, R. S. Royal Yacht Club, Hobart.

1927 Sanderson, R. S., J.P. Burnie, Tasmania.

1922 Sargison, H. Elizabeth-street, Hobart.

1921 Savigny, J. A.M.P. Chambers, Launceston.

Year of Election.

1921 Scott, H. H. Curator, Queen Victoria Museum, Launceston.

1928 Scott, R. A. Department of Agriculture, Hobart.

1896 Scott, R. G., M.B., Ch.M. 172 Macquarie Street, Hobart.

1927 Shield, R. J. 122 Collins Street, Hobart.

1921 Shields, Honourable Tasman, M.L.C. 13 Patterson Street, Launceston.

1925 Shoobridge, K. Macquarie Plains, Tasmania.

1921 Shoobridge, Honourable L. M., M.L.C. "Sunnyside," New Town.

1925 Shoobridge, Rupert. "Fenton Forest," Glenora.

1923 Shoobridge, S. E. C/o Messrs. H. Jones and Co., Hobart.

1927 Shugg, Dr. Macquarie Street, Hobart.

1923 Simson, Mrs. L. 3 St. George's Square, Launceston.

1927 Smith, Miss Marjorie. "Glithno," Errita, Wilmot.

1925 Smith, Colonel R. P. A.M.P. Society, Hobart.

1921 Smithies, F. 34 Patterson Street, Launceston.

1925 Stackhouse, C. K. R. 55 Patterson Street, Launceston.

1928 Steele, R. N., B.Sc. Department of Agriculture, Hobart.

1924 Stephens, Crofton. Messrs. Clerk, Walker, Stops, and Stephens, Collins Street, Hobart.

1927 Strutt, H. W. C/o Messrs. Macfarlane Bros., Hobart.

1927 Sweetnam, H. W., M.B., Ch.B. Macquarie Street, Hobart.

1920. Swindells, A. W. C/o Messrs. Murdoch Bros., Market Place, Hobart.

1927 Tankard, L. W. Sheffield, Tasmania.

1918 Taylor, W. E. Elboden Street, Hobart.

1920 Taylour, W. H. Equitable Buildings, Collins Street, Melbourne.

1923 Thomas, J. F. Room 8, Wilga Chambers, 158 Phillip Street, Sydney.

1922 Thomas, Lieutenant-Colonel L. R., D.S.O. Registrar of the Tasmanian University, Hobart.

1921 Thomas, P. H. Agricultural Department, Hobart.

1922 Thompson, E. H. Lower Sandy Bay.

1918 Thorold, C. C. Hutchins School, Hobart.

1928 Tribolet, D. R. 34 Proctor's Road, Hobart.

1926 Turner, A. Jefferis, M.D., F.E.S. Wickham Terrace, Brisbane, Queensland.

1927 Turner, J. W. Mona Street, Battery Point.

Year of Election.

1923 Unwin, E. E., M.Sc. Commercial Road, New Town.
1927 Valentine, F. D. 41 Main Road, New Town.
1927 Walch, J. H. B., M.B. 71 Crescent Road, West Hobart.
1918 Walch, P. B. C. King Street, Sandy Bay.
1925 Walker, Norman. The Hutchins School, Hobart.
1928 Walters, Rev. Walter. Scottsdale, Tasmania.
1926 Ward, F. E. Director of Agriculture, Hobart.
1913 Wardman, John. Superintendent Botanical Gardens, Hobart.
1918 Waterhouse, G. W. Messrs. Ritchie and Parker, Alfred Green and Co., Launceston.
1922 Watson, D. W. "Undine," Glenorchy.
1926 Waugh, Eric C., LL.B. High Street, Sandy Bay.
1922 Wayn, Miss A. L. C/o Chief Secretary's Department, Hobart.
1918 Weber, A. F. Lands Department, Hobart.
1927 Wells, Frank. 16 Montagu Avenue, New Town.
1928 Weston, J. W. Department of Agriculture, Hobart.
1927 Whishaw, R., M.B., Ch.M. Macquarie Street, Hobart.
1926 Whittle, B. N. Augusta Road, New Town.
1925 Winch, M. C/o Brownells Ltd., Hobart.
1901 Wise, H. J. Lambert Avenue, Sandy Bay.

ANNUAL REPORT
1928.

The Council and Officers.

The Annual Meeting was held at the Society's Rooms, Tasmanian Museum, Hobart, on 12th March, 1928.

The following were elected as members of the Council for 1928:—Dr. A. H. Clarke, Dr. W. E. L. Crowther, Messrs. W. H. Clemes, L. F. Giblin, J. A. Johnson, A. N. Lewis, J. Reynolds, L. Rodway, E. E. Unwin, and C. E. Lord (*ex officio*).

During the year nine meetings of the Council were held, the attendance being as follows:—Dr. Clarke 9, Mr. Lord 9, Dr. Crowther 8, Mr. Johnson 7, Mr. Lewis 7, Mr. Rodway 7, Mr. Reynolds 7, Mr. Unwin 7, Mr. Clemes 6, and Mr. Giblin 4.

The Council at its first meeting made the following appointments:—

Chairman of Council.—Dr. A. H. Clarke, M.R.C.S., L.R.C.P.

Secretary.—Mr. Clive Lord.

Hon. Treasurer.—Dr. W. E. L. Crowther.

Standing Committee.—Messrs. Unwin, Giblin, and Lord.

Editor of Papers and Proceedings.—Mr. Clive Lord.

Trustees of the Tasmanian Museum and Botanical Gardens.—Dr. Clarke, Dr. Crowther, Messrs. Clemes, Lewis Rodway, and Unwin.

During the year one special and ten ordinary meetings of the Society were held. Details of the meetings will be found in the Abstract of Proceedings. The attendance of members at the meetings during the year was well maintained.

Membership.

The membership roll at the end of the year showed the position of the Society to be as follows:—

4 Honorary Members.
7 Corresponding Members.
6 Life Members.
257 Ordinary Members.

Library.

The position of the Library continues to give the Council considerable concern. It had been hoped that the proposal to erect additions to the Museum and Art Gallery would have been advanced sufficiently to provide some prospect of relief in the near future, as the plans of the proposed additions included provision for extension to the Society's Library. The proposal, however, has again been deferred. The

Government, however, granted additional financial assistance to the Museum as regards its annual financial grant, and in view of the assistance rendered to the Museum work and the State by the Royal Society's Library, further assistance by the Museum staff will be available as regards cataloguing and care of the Library. The Council desires to express its appreciation of the recognition afforded by the Government in this direction.

The important position, from the scientific aspect, which the Society's Library bears to the State may be gathered from a review of the provisional catalogue of scientific and technical periodicals which is being compiled by the Council of Scientific and Industrial Research. The list of periodicals contained in the provisional catalogue shows that the Library of the Society contains 593 sets or portions of sets of scientific and technical publications, the Library of the Geological Survey 298, the Botanical Gardens 93, the Department of Agriculture 46, the Public Library 37, the University of Tasmania 30, the Zeehan School of Mines 27, and the Queen Victoria Museum, Launceston, 15.

Historical.

The publication of Mr. R. W. Giblin's work on the early history of Tasmania is much appreciated by the Society, and the Council desires to place on record its deep appreciation, not only of the work done by Mr. Giblin on behalf of Tasmanian history, but also for several very valuable presentations to the historical section of the Society's Library.

Fauna Preservation.

In view of the many occasions in which the matter of Fauna Preservation has been discussed by the Society, it is pleasing to record that Parliament has passed a measure for the creation of a special board to control the fauna of the State.

Sections.

The several sections continued their special work during the period under review, and details concerning their activities will be found in the Sectional Reports.

The thanks of the Society are due to Mr. A. V. Giblin for the work done in organising a botanical section as a result of the visit to Tasmania of Dr. Arthur Hill, Director of the Kew Botanic Gardens.

Obituary.

It is with regret that the Society has to report the deaths of the following members:—

Messrs. H. T. Gould, G. W. Ife, A. Mathers, R. W. Thirkell.

BRANCH REPORT

NORTHERN BRANCH.

ANNUAL REPORT FOR 1928.

Our Annual meeting was held on 12th June, when the following members were present:—Mr. W. R. Rolph (Chairman), Messrs. H. H. Scott, Harrap, Smithies, Martin, Mrs. Robson, and Secretary. Apologies received from Hon. T. Shields, M.L.C., Messrs. R. O. Miller, J. E. Heritage, J. R. Forward, and Meston.

Annual Report and Balance Sheet read and adopted on motion of Chairman.

Election of Officers:—Council, Hon. T. Shields, Messrs. Heritage, Miller, Rolph, Smithies, Forward, Heyward, Reid, Rolph, and Padman. Secretary and Treasurer, R. S. Padman.

At the conclusion of the formal business Mr. H. H. Scott gave an interesting illustrated talk on the possibilities of the Beattie Collection as a basis for historical research.

During the year Mr. Scott, curator of Queen Victoria Museum, Launceston, has been occupied in preparing for exhibition the recently acquired Beattie Collection of objects relating to the early history of Tasmania. The collection is a valuable acquisition to Launceston. Those sections already opened to the public have created considerable interest, and we hope students will be inspired to undertake original research into Tasmanian history.

On 19th December Mr. R. W. Legge, of Cullenswood, gave an illustrated Travel Talk on his recent trip to the ancient aboriginal camps in Central Australia. The meeting aroused considerable interest and was well attended by members and the public.

SECTION REPORTS

BOTANICAL SECTION.

The Botanical Section was formed in August (*vide* Abstract of Proceedings 13/8/1928). The Section has for its first objective the making of a complete collection of Tasmanian Flora, which includes all plant life from grasses, herbs, shrubs, trees, to algæ and agarics.

The Section held its first meeting on 17th September last, and already numbers 18 members and 17 collectors.

With the approval of the Trustees of the Tasmanian Museum, it has been decided to give the collection the name of the Tasmanian Museum Herbarium. The Trustees of the Museum have made our way easy by providing a room where the specimens may be dried, sorted, and mounted. Mr. Rodway resigned as a Trustee of the Museum last October, and towards the end of the year was appointed Director of the Tasmanian Museum Herbarium, so the Section now has the advantage of his unrivalled knowledge of the Tasmanian flora.

The arrangement and general plan of the Herbarium, the writing up of the Herbarium Register and Species Book, each containing some 1,300 names, has been carried out entirely by Mr. L. Rodway and Mrs. Rodway, thus enabling the Section to start on right lines. The writing up of the Register and Species Book, which required special botanical knowledge, entailed many hours of laborious work, for which the Section desires to place on record its deep appreciation.

The Herbarium will provide a means of reference by which anyone interested can inform himself of the particular family to which any Tasmanian plant belongs. To this end, the Section has started an identification section, which will forward brief descriptions and identification of any specimen of Tasmanian plant submitted. It is proposed to collect sufficient specimens of each species to provide not only for our own Herbarium but a duplicate set for the Royal Botanic Gardens at Kew, and a third set for a Federal Herbarium which Mr. Lane Poole is proposing to establish at Canberra.

to Tasmania. If this venture is successful it will be the means of exchanging a number of useful plants between Tasmania and Great Britain, and so enlarge the benefits of that useful institution, our Botanical Gardens.

In the Herbarium we have the extensive collection of mosses made by the late W. A. Weymouth. The Section has also charge of a remarkably well mounted collection of seaweeds made by Miss G. T. Seccombe at Port Arthur many years ago.

Though it has only been actively in existence some three short months, over six hundred species have been mounted and labelled, as well as many duplicates intended for transmission to Kew and Canberra.

The Tasmanian Field Naturalists' Club handed over their large collection of flowering plants, and this collection formed a most useful nucleus for the Herbarium.

A. V. GIBLIN,

Hon. Secretary Botanical Section.

EDUCATION SECTION.

Members.—L. Dechaineux (President), J. A. Johnson, T. W. Blaikie, J. Reynolds, L. F. Giblin, H. T. Parker, E. Unwin, H. Eyre, W. H. Clemes, A. Newall, Geo. Huxley, C. W. McFarlane, D. H. Tribolet.

Average Attendance.—Seven members.

Papers.

"Education of the Jesuits." J. A. Johnson, M.A.

"Education among the Jews." E. Unwin, M.Sc.

"Education in Italy." L. Dechaineux.

"Education in the South American Republics." H. T. Parker, M.A.

"Education in Canada." G. Huxley, M.A.

"The Port Royalists." J. Reynolds and A. Newall.

"Education in Ireland." W. H. Clemes, B.A., B.Sc.

THE ROYAL SOCIETY OF TASMANIA.

GENERAL FUND.

STATEMENT OF RECEIPTS AND EXPENDITURE.

RECEIPTS.

	£	s.	d.	£	s.	d.
Balance brought forward				0	3	7
Subscriptions—						
Arrears	3	3	0			
Current	224	14	0			
Advance	1	1	0			
				228	18	0
Sale of Publications				0	12	6
Government Grant				100	0	0
Rent of Room				14	10	0
				£344	4	1

EXPENDITURE.

	£	s.	d.	£	s.
Salaries				38	0
Papers and Proceedings—					
1927 (part)	153	8	0		
1928 (part)	52	1	11		
				205	9
Printing, Notices of Meetings, etc.				17	15
Library				19	5
Insurance				5	18
Fuel and Light				3	7
Petty Cash and Postages				13	2
Northern Branch				9	9
Royal Society Medal				21	7
Miscellaneous				9	11
				£343	6
Balance				0	17
				£344	4

Examined and certified to be correct,

(Signed) WALTER E. TAYLOR, F.F.I.A.,
Hon. Auditor.

10th January, 1929.

CLIVE E. LORD,
Secretary.

W. L. CROWTHER,
Hon. Treasurer.

THE ROYAL SOCIETY OF TASMANIA.

MORTON ALLPORT MEMORIAL FUND, 1928.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
Interest	4	17	6	Refund of advance to R.M.J. Fund	10	4	0
Interest and Conversion Fee	7	16	0	Balance	2	9	6
	£12	13	6		£12	13	6

Examined and certified to be correct.
(Signed) WALTER E. TAYLOR, F.F.I.A.,
Hon. Auditor.
10th January, 1929.

CLIVE E. LORD,
Secretary.
W. L. CROWTHER,
Hon. Treasurer.

£200 was raised by Public Subscription in 1878 to establish a Memorial to the late Morton Allport. The Fund is invested in the name of the Perpetual Trustees, Executors, and Agency Co. of Tasmania Ltd., and the income is used for the purchase of Books for the Library of the Society.

R. M. JOHNSTON MEMORIAL FUND.
RECEIPTS AND EXPENDITURE FOR 1928.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
Balance brought forward	4	8	0	Purchase of books for Library	18	4	0
Interest	14	12	0	Balance carried forward	11	0	0
Refund of advance to M.A.M. Fund	10	4	0				
	£29	4	0		£29	4	0

Examined and certified to be correct.
(Signed) WALTER E. TAYLOR, F.F.I.A.,
Hon. Auditor.
10th January, 1929.

CLIVE E. LORD,
Secretary.
W. L. CROWTHER,
Hon. Treasurer.

The Memorial to the late R. M. Johnston was established in 1921. The income from the fund raised by public subscription is used for the purchase of books for the Library and for the Memorial Medal awarded to the R. M. Johnston Lecturer from time to time.

THE ROYAL SOCIETY OF TASMANIA.

NORTHERN BRANCH.

ANNUAL FINANCIAL STATEMENT FOR YEAR ENDING DECEMBER, 1928.

	£	s.	d.		£	s.	d.
Balance brought forward	25	15	6	Printing	1	12	6
Interest	1	0	4	Advertising	1	0	0
Share of Subscriptions	9	9	0	Postages and Petty	0	7	6
				Balance in Bank	33	4	10
	£36	4	10		£36	4	10

R. STEWART PADMAN,
Hon. Sec. and Treasurer.

J. E. HERITAGE
Hon. Auditor.

INDEX

Titles of Papers and New Genera and Species in Heavy Type.
Synonyms in *italics*.

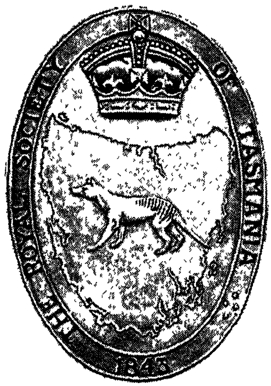
R. M. JOHNSTON MEMORIAL.

THE R. M. JOHNSTON MEMORIAL MEDAL.

List of Awards:

1923 Sir T. W. Edgeworth David, K.B.E., C.M.G., B.A., F.R.S., F.G.S.

1925 Professor F. Wood-Jones, M.B., B.S., M.R.C.S., L.R.C.P., D.Sc.



THE ROYAL SOCIETY OF TASMANIA MEDAL.

List of Awards:

1927 L. Rodway, C.M.G.

Note.—The Royal Society of Tasmania Medal was established in 1927. It is awarded for eminence in research and for work of outstanding merit on behalf of the Society and the State (*vide* Abstract of Proceedings, P. & P., 1927, pp. 212-214).

Papers and Proceedings
of
The Royal Society of Tasmania

THE ROYAL SOCIETY OF TASMANIA

PAPERS AND PROCEEDINGS, 1928.

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